Fire-Rated Assemblies in Commercial Construction

The Purple Book™

National Gypsum®

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NATIONAL GYPSUM COMPANY

FIRE-RATED ASSEMBLIES
IN COMMERCIAL CONSTRUCTION

National Gypsum®

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Architects, engineers, designers or contractors involved should review these details with the governing code or inspection official at the time of the job submittal to determine if there are any discrepancies with local code or regulatory requirements. In any event, they must NOT be used without a complete evaluation by the owner's design professional to verify the suitability of the system for a given application.

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For a guide to fire safety information relating to certain systems described in this PURPLE ® Book, please refer to the information on National Gypsum Company's website at http://nationalgypsum.com/ng/resources/fire-safety.htm , or call 1-800-NATIONAL®.

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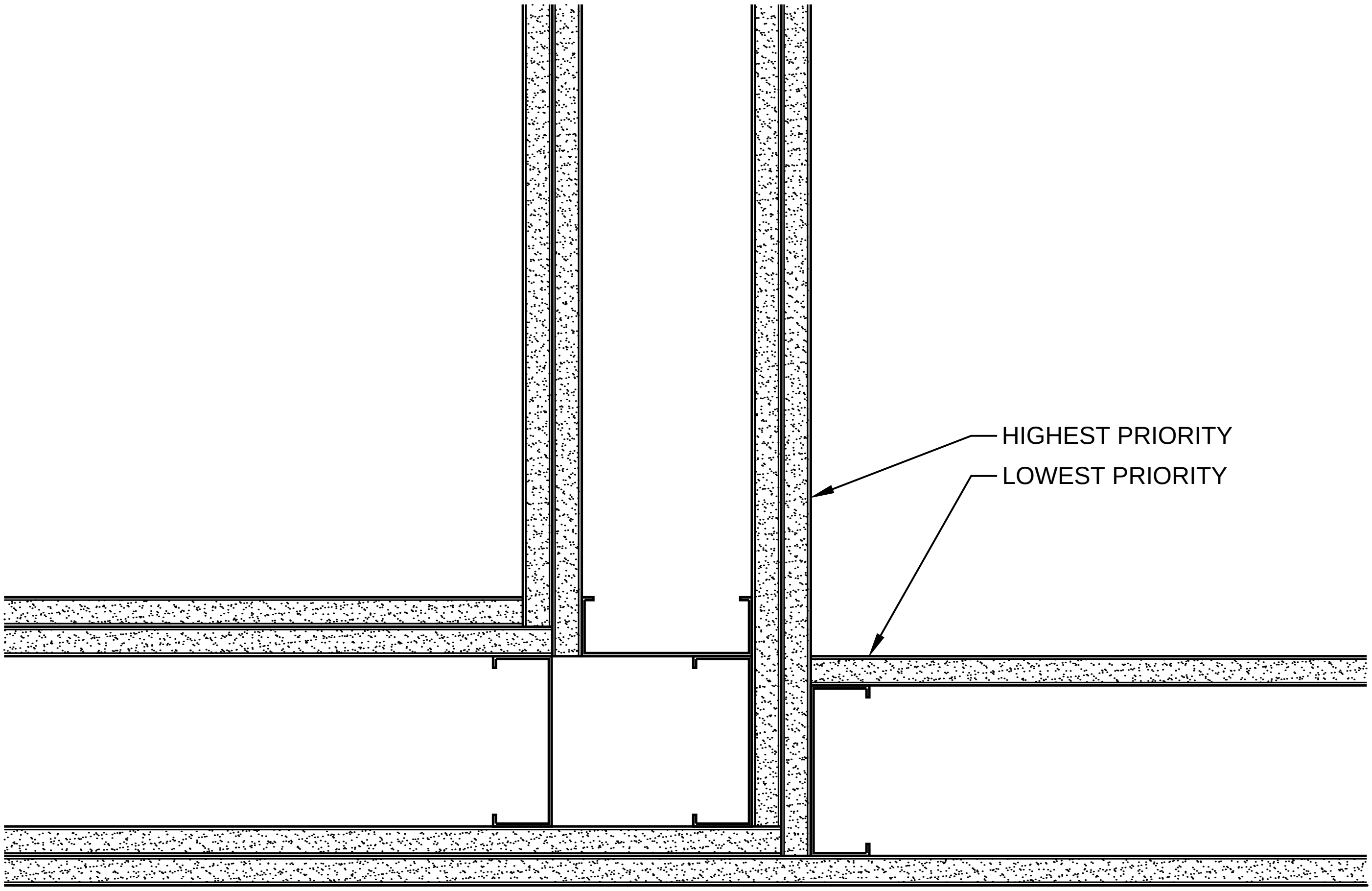
UL Core Type Designation	Product Name
Type FSK	5/8” Gold Bond® Brand Kal-Kore® Fire-Shield® Plaster Base, Type X
Type FSK-C	1/2” Gold Bond® Brand Kal-Kore® Fire-Shield C™ Plaster Base, Type C 5/8” Gold Bond® Brand Kal-Kore® Fire-Shield C™ Plaster Base, Type C
Type FSL30	5/8” Gold Bond® Brand High Strength Fire-Shield® LITE® 30 Gypsum Board
Type FSMR-C	1/2” Gold Bond® Brand XP® Fire-Shield C™ Gypsum Board, Type C 5/8” Gold Bond® Brand XP® Fire-Shield C™ Gypsum Board, Type C
Type FSW	5/8” Gold Bond® Brand Fire-Shield® Gypsum Board, Type X 5/8” Gold Bond® Brand Fire-Shield® Exterior Soffit Board, Type X 5/8” Gold Bond® Brand Hi Abuse® XP® Fire-Shield® Gypsum Board,Type X 5/8” Gold Bond® Brand Sta-Smooth® Fire-Shield® Gypsum Board, Type X 5/8” Gold Bond® Brand Fire-Shield® Gypsum Sheathing, Type X 5/8” Gold Bond® Brand XP® Fire-Shield® Gypsum Board, Type X 1” Gold Bond® Brand Fire-Shield® Shaftliner, Type X 1” Gold Bond® Brand Fire-Shield® Shaftliner XP®, Type X
Type FSW-C	1/2” Gold Bond® Brand Fire-Shield C™ Gypsum Board, Type C 1/2” Gold Bond® Brand Sta-Smooth® Fire-Shield C™ Gypsum Board, Type C 5/8” Gold Bond® Brand Fire-Shield C™ Gypsum Board, Type C 5/8” Gold Bond® Brand Sta-Smooth® Fire-Shield C™ Gypsum Board,Type C
Type FSW-G	1/2” Gold Bond® Brand Gridstone® Gypsum Ceiling Panels 1/2” Gold Bond® Brand Gridstone® CleanRoom Gypsum Ceiling Panels
Type FSW-3	5/8” Gold Bond® Brand Fire-Shield® Gypsum Sheathing, Type X 5/8” Gold Bond® Brand XP® Fire-Shield® Gypsum Board, Type X
Type FSW-5	5/8” Gold Bond® Brand Hi-Impact® XP® Fire-Shield® Gypsum Board, Type X 5/8” Gold Bond® Brand Hi Abuse® XP® Fire-Shield® Gypsum Board,Type X
Type FSW-6	5/8” Gold Bond® Brand eXP® Extended Exposure Sheathing, Type X 5/8” Gold Bond® Brand eXP® Interior Extreme® Gypsum Panel, Type X 5/8” Gold Bond® Brand eXP® Fire-Shield® Tile Backer, Type X 5/8” Gold Bond® Brand eXP® Interior Extreme® IR Gypsum Panel, Type X 5/8” Gold Bond® Brand eXP® Interior Extreme® AR Gypsum Panel, Type X
Type FSW-7	1” Gold Bond® Brand eXP® Extended Exposure Shaftliner, Type X
Type SoundBreak XP	5/8” Gold Bond® Brand SoundBreak® XP® Gypsum Board, Type X
Type FSL	5/8” Gold Bond® Brand High Strength Fire-Shield® LITE®, Type X
Type FSW-8	5/8” Gold Bond® Brand Fire-Shield® Gypsum Sheathing, Type X

DATE: 11/05/13	UL DESIGNATIONS FOR GOLD BOND® PRODUCTS	National Gypsum®
SCALE:	DETAIL: GN 101	

ASTM Product Standards	
C 1177	Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
C 1178	Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
C 1396	Standard Specification for Gypsum Board
C 1658	Standard Specification for Glass Mat Gypsum Panels
ASTM Test Standards	
C 473	Standard Test Methods for Physical testing of Gypsum Panel Products
C 1629	Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels
D 3273	Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
E 84	Standard Test Method for Surface Burning Characteristics of Building Materials
E 90	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
E 96	Standard Test Methods for Water Vapor Transmission of Materials
E 119	Standard Test Methods for Fire Tests of Building Construction and Materials
E 136	Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C
G 21	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
ASTM Application Standards	
C 840	Standard Specification for Application and Finishing of Gypsum Board
C 1280	Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing

Gypsum Association Standards	
GA-214	Recommended Levels of Gypsum Board Finish
GA-216	Application and Finishing of Gypsum Panel Products
GA-253	Application of Gypsum Sheathing

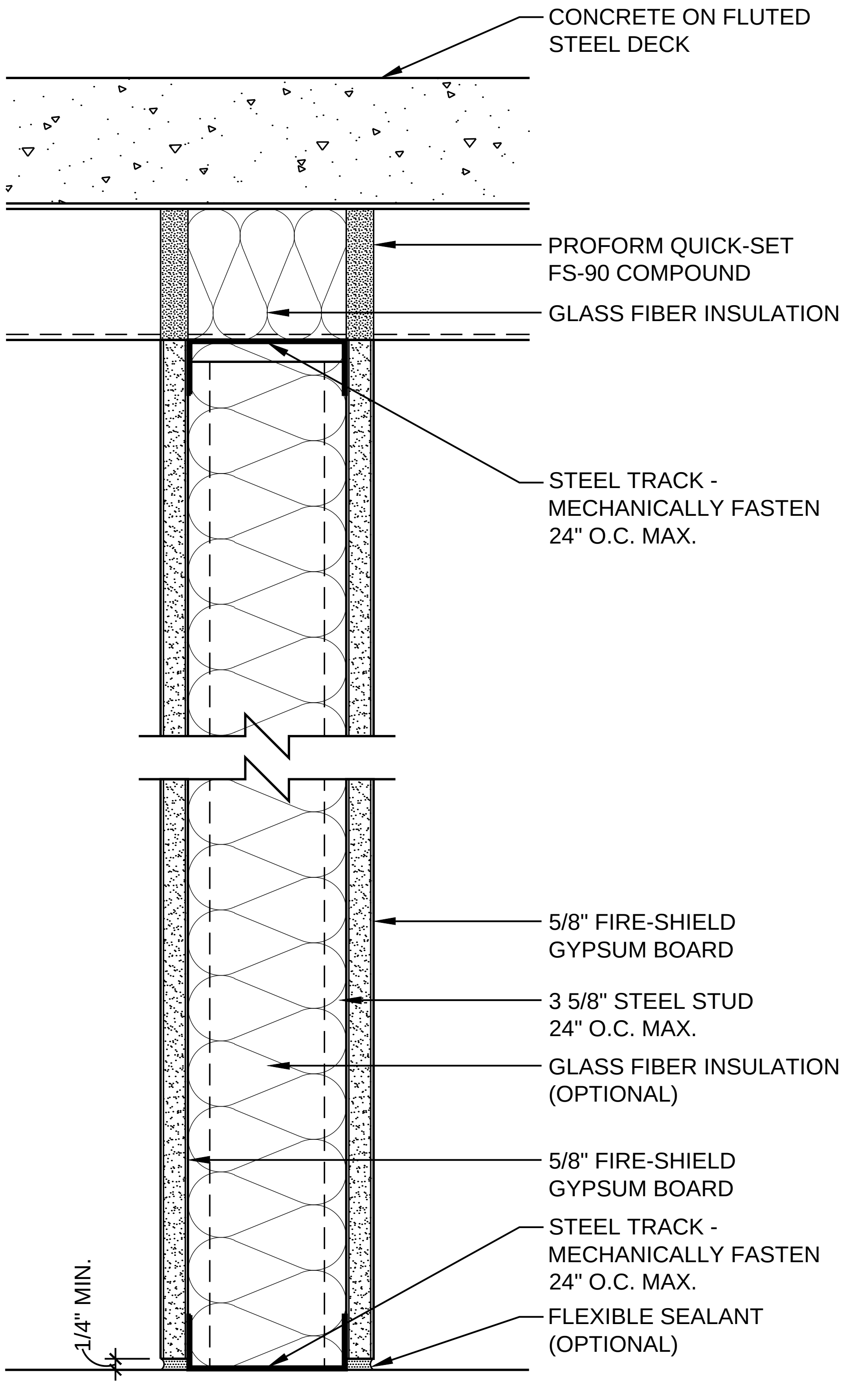
DATE: 11/05/13	ASTM AND GYPSUM ASSOCIATION STANDARDS	National Gypsum®
SCALE:	DETAIL: GN 102	


HIGHEST PRIORITY
LOWEST PRIORITY

WALL PRIORITY LEGEND

2 HOUR FIRE AND SMOKE WALL	PRIORITY 1
2 HOUR FIRE WALL 2 HOUR SHAFTWALL	PRIORITY 2
1 HOUR FIRE AND SMOKE WALL	PRIORITY 3
1 HOUR FIRE WALL	PRIORITY 4
NON-RATED WALL	PRIORITY 5

DATE: 11/05/13	WALL PRIORITY LEGEND	National Gypsum
SCALE: 3"=1'-0"	DETAIL: GN 103	


CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
GLASS FIBER INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
WHI 495-PSV-1067

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

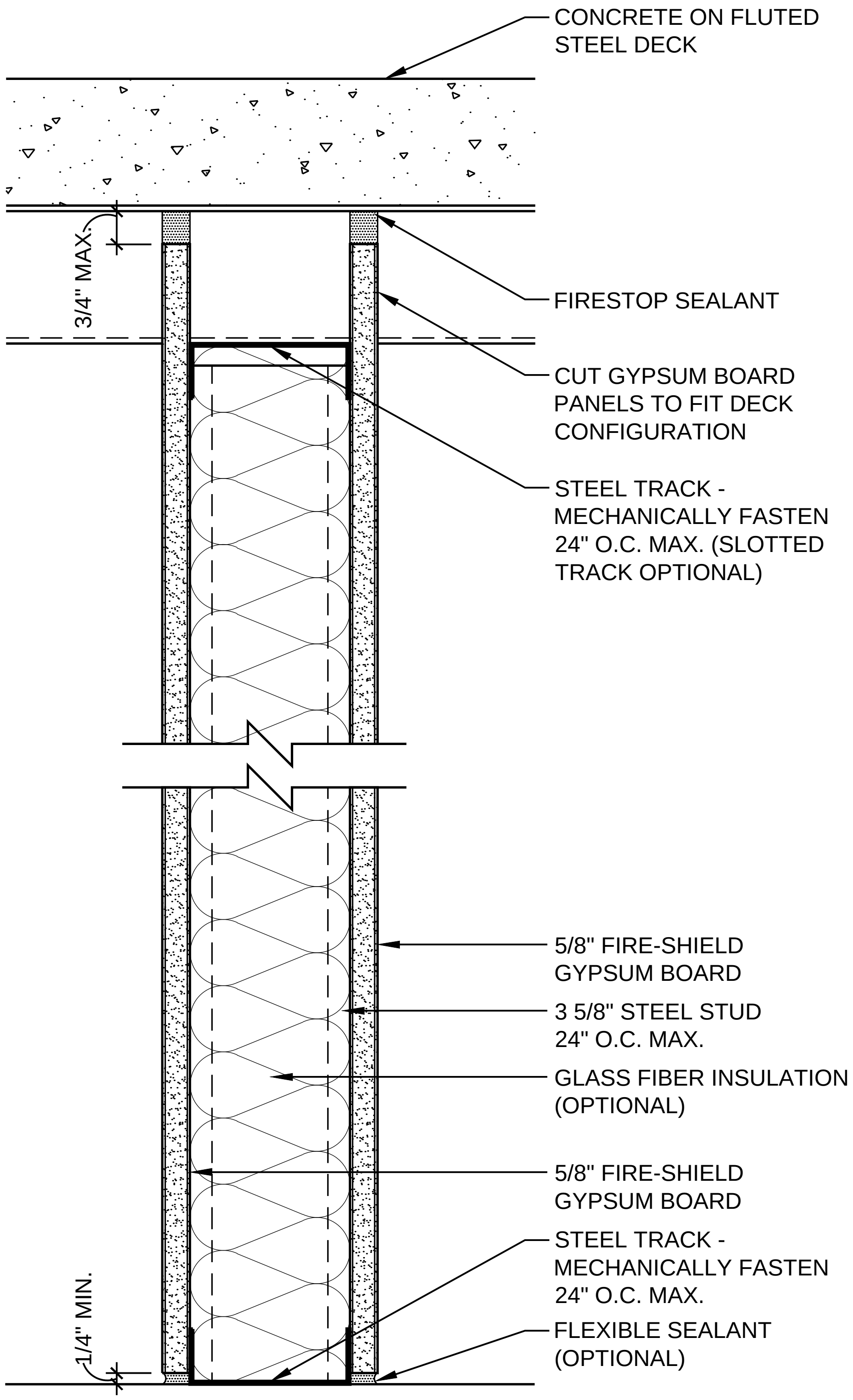
DATE: 11/05/13

1 HOUR PARTITION TO STEEL DECK

SCALE: 3"=1'-0"

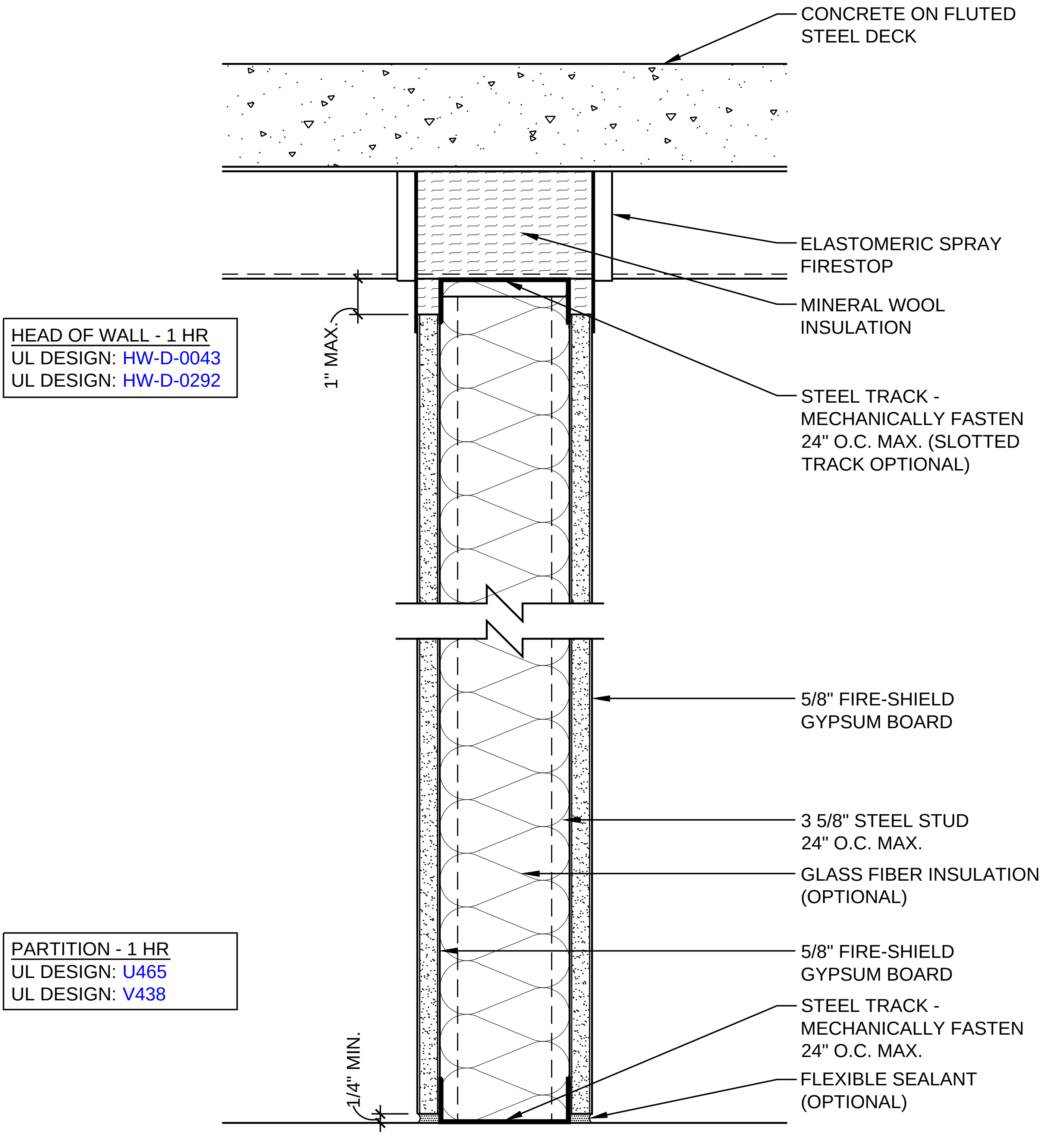
DETAIL: SS101

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0103
UL DESIGN: HW-D-0076


CONCRETE ON FLUTED STEEL DECK
3/4" MAX.
FIRESTOP SEALANT
CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

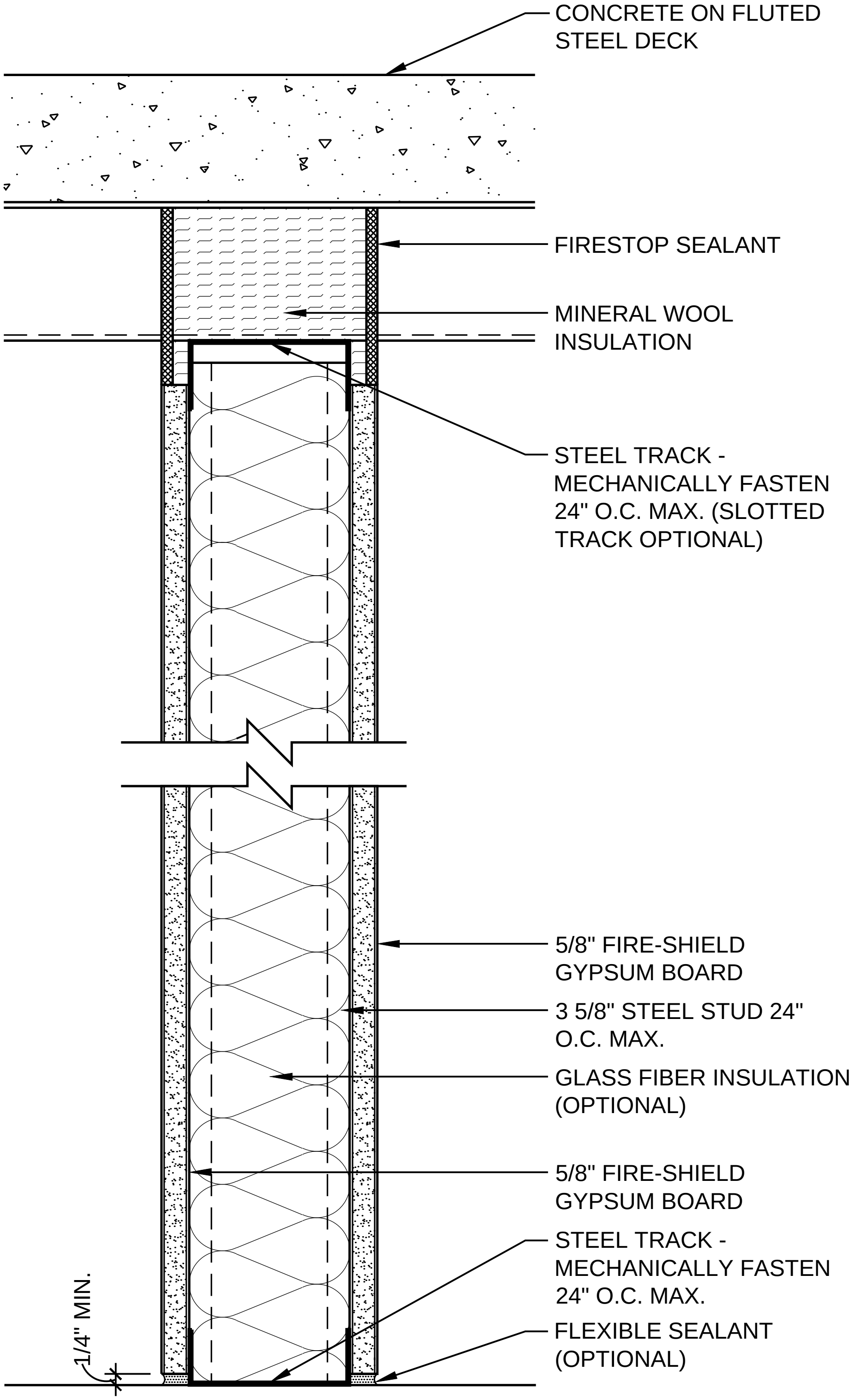
DATE: 11/05/13	1 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 102	


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
1" MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 103	

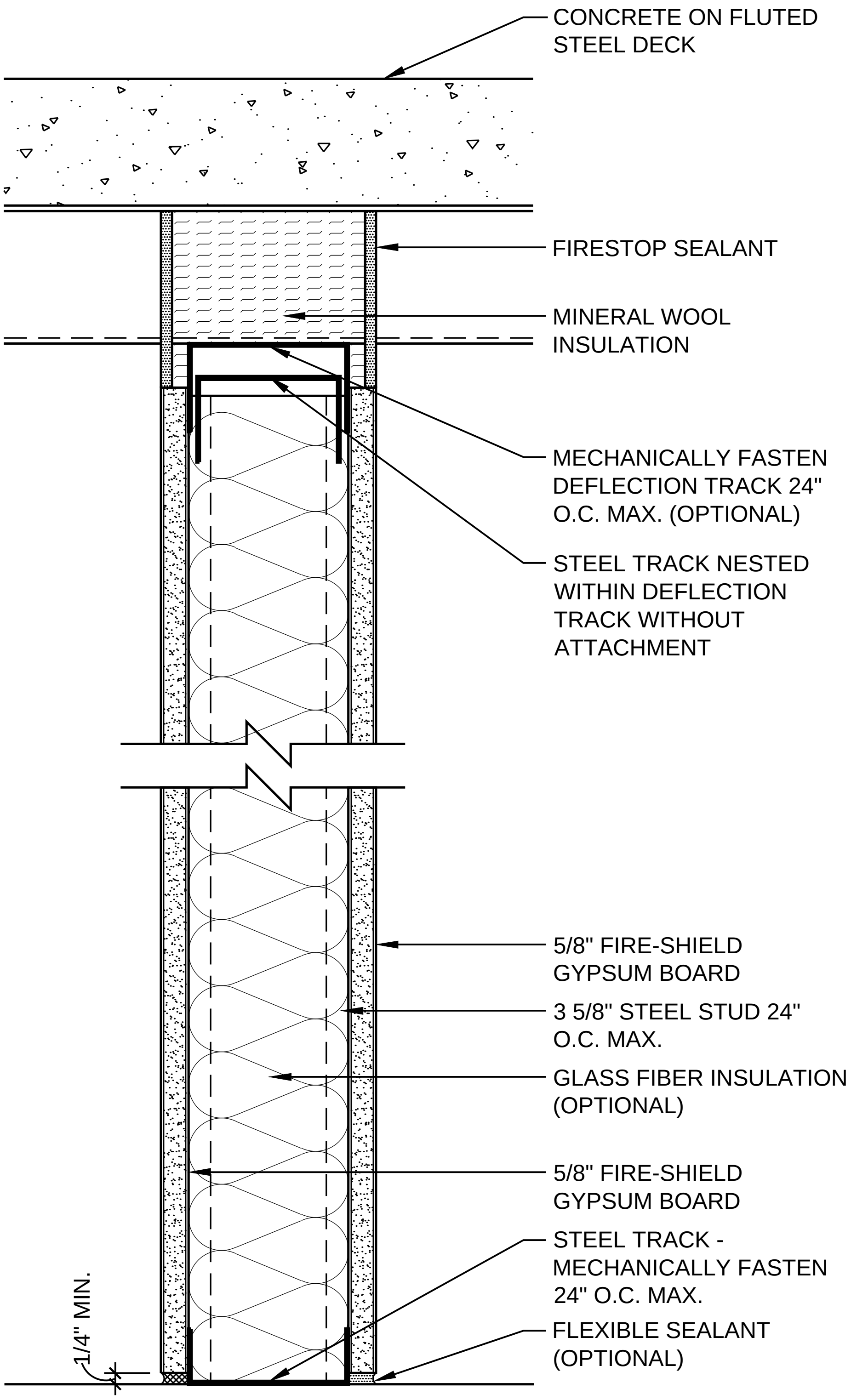

CONCRETE ON FLUTED STEEL DECK
FIRESTOP SEALANT
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0034
UL DESIGN: HW-D-0045

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 104	

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0034
UL DESIGN: HW-D-0045


CONCRETE ON FLUTED STEEL DECK
FIRESTOP SEALANT
MINERAL WOOL INSULATION
MECHANICALLY FASTEN DEFLECTION TRACK 24" O.C. MAX. (OPTIONAL)
STEEL TRACK NESTED WITHIN DEFLECTION TRACK WITHOUT ATTACHMENT
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

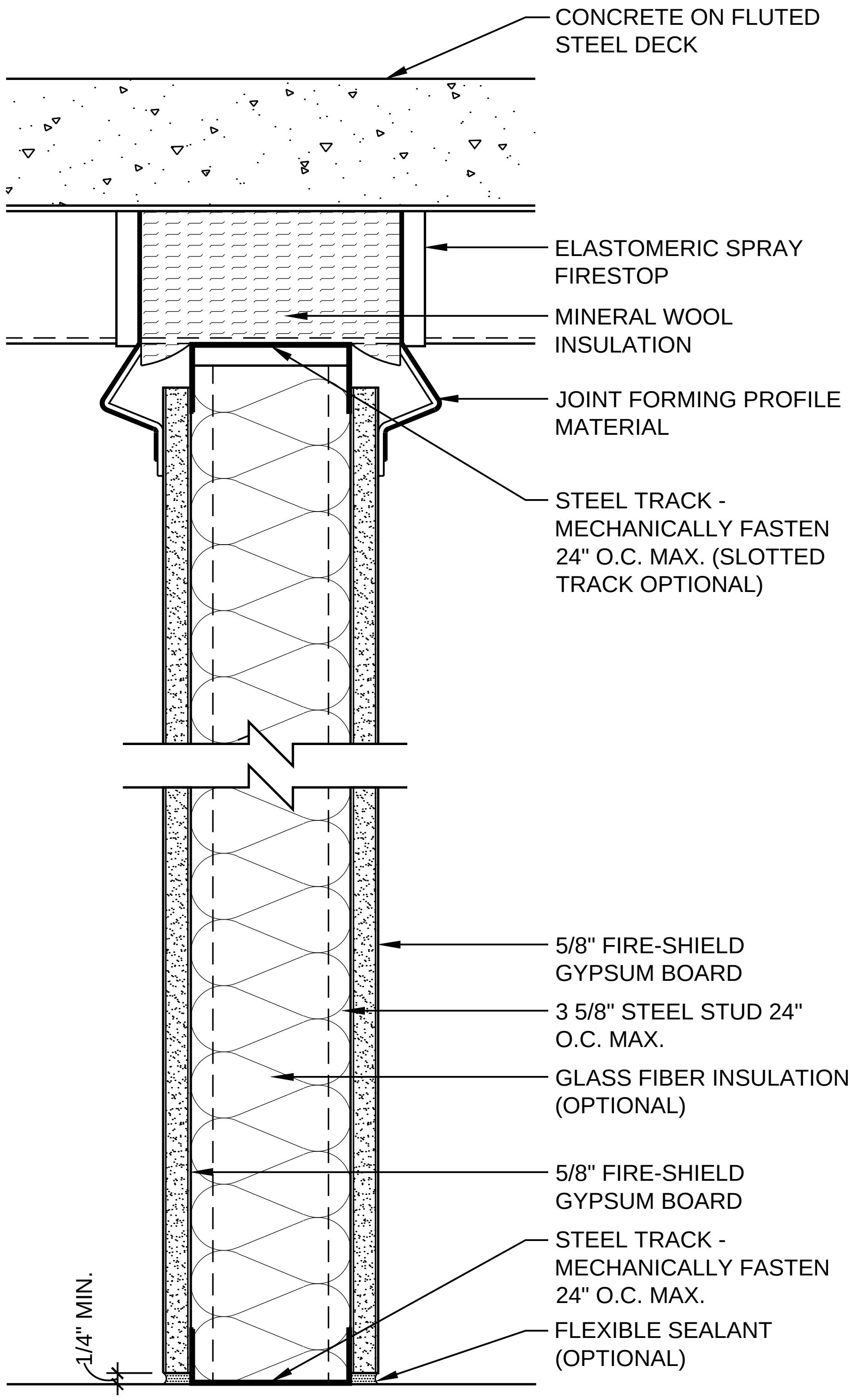
PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13

1 HOUR PARTITION WITH DEFLECTION TRACK

SCALE: 3"=1'-0"

DETAIL: SS 105


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
JOINT FORMING PROFILE MATERIAL
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

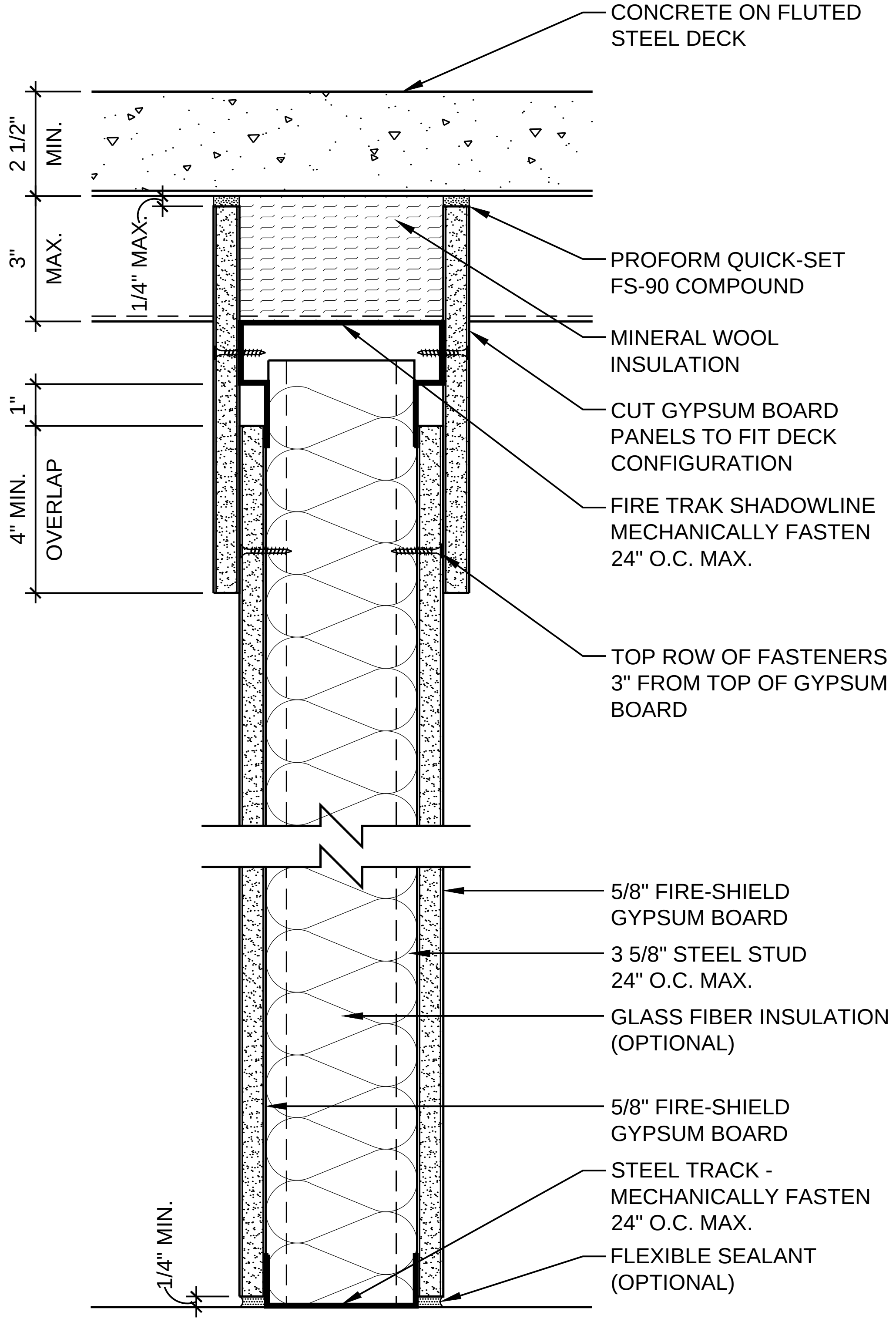
HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0363

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 106	

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0060

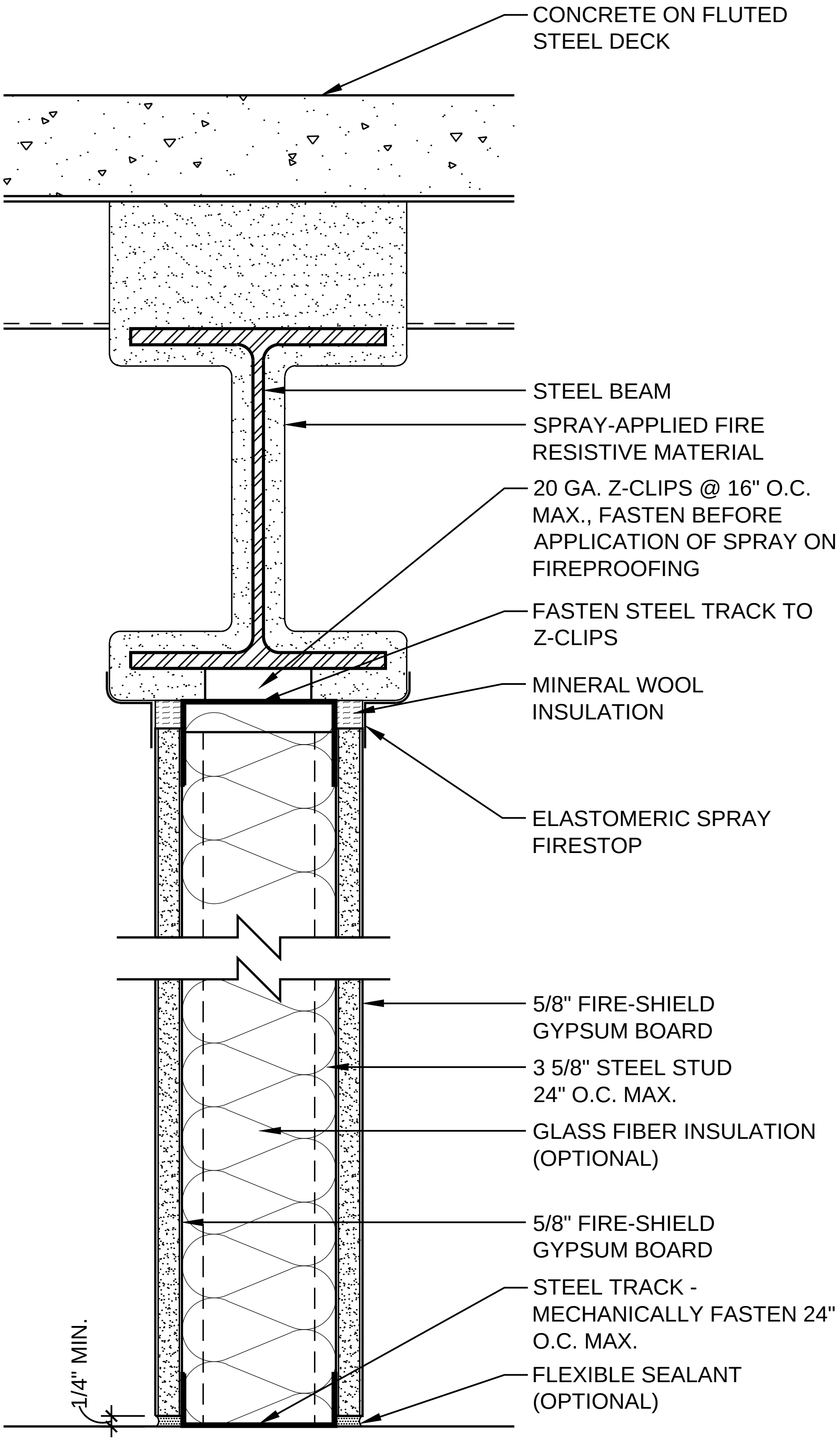
PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438


CONCRETE ON FLUTED STEEL DECK
2 1/2" MIN.
3" MAX.
1/4" MAX.
1"
4" MIN. OVERLAP
PROFORM QUICK-SET FS-90 COMPOUND
MINERAL WOOL INSULATION
CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION
FIRE TRAK SHADOWLINE MECHANICALLY FASTEN 24" O.C. MAX.
TOP ROW OF FASTENERS 3" FROM TOP OF GYPSUM BOARD
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

DATE: 11/05/13	1 HOUR PARTITION WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 107	

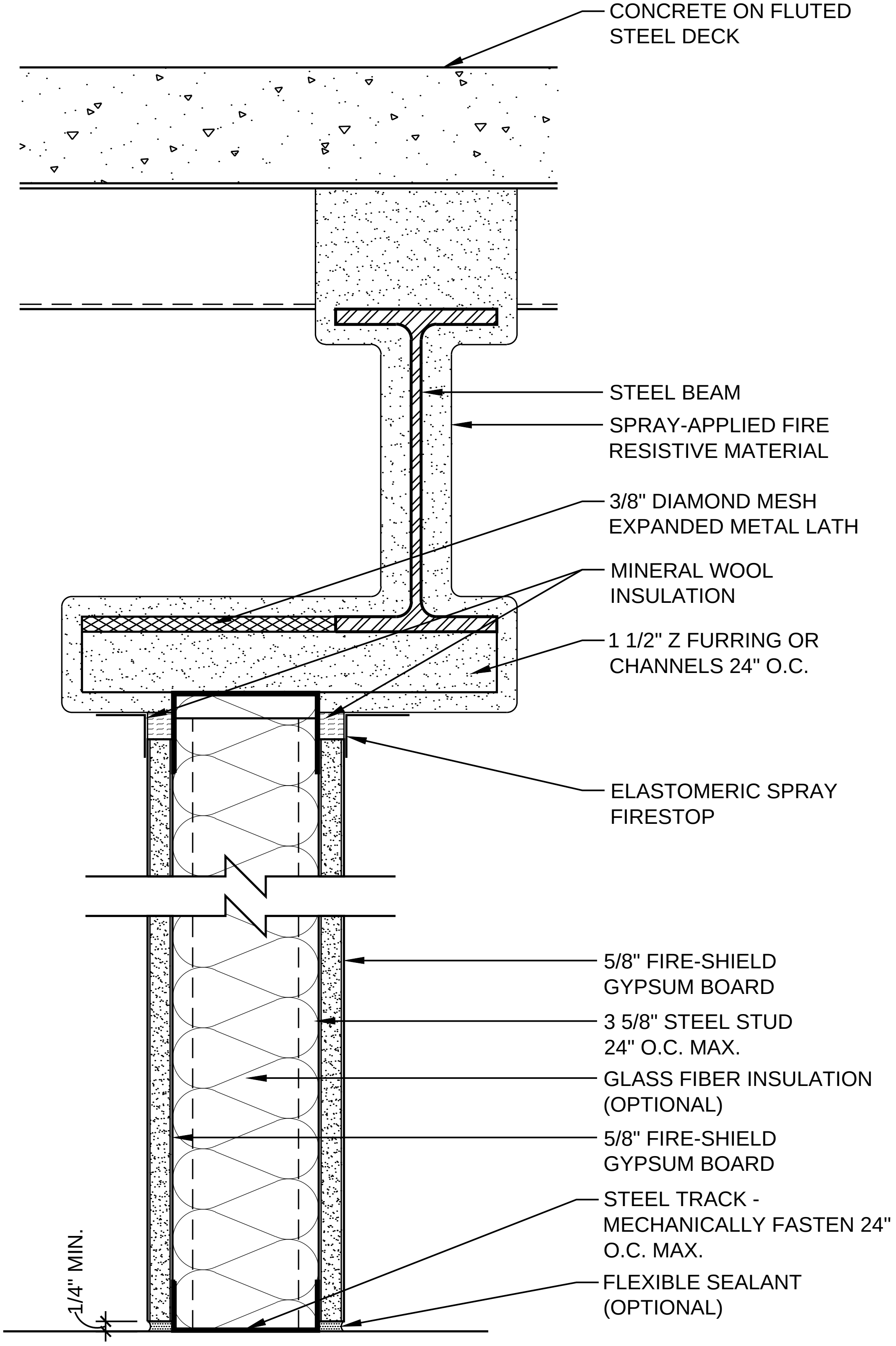
HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0252
UL DESIGN: HW-D-0259

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438


CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
20 GA. Z-CLIPS @ 16" O.C. MAX., FASTEN BEFORE APPLICATION OF SPRAY ON FIREPROOFING
FASTEN STEEL TRACK TO Z-CLIPS
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

DATE: 11/05/13	1 HOUR PARTITION TO STEEL BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 108	

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0617
UL DESIGN: HW-D-0635

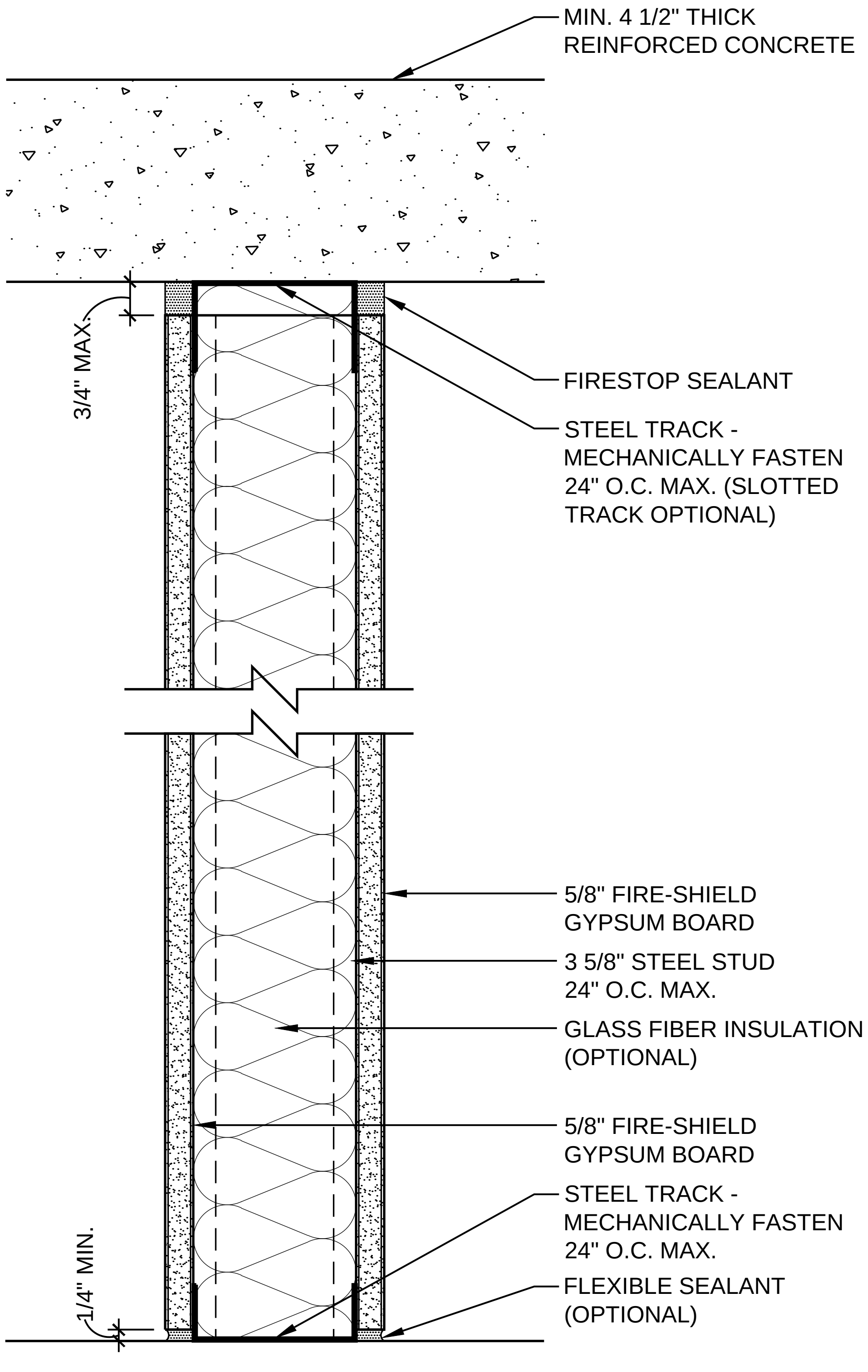

CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
3/8" DIAMOND MESH EXPANDED METAL LATH
MINERAL WOOL INSULATION
1 1/2" Z FURRING OR CHANNELS 24" O.C.
ELASTOMERIC SPRAY FIRESTOP
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HOUR PARTITION OFFSET FROM BEAM
SCALE: 3"=1'-0"	DETAIL: SS 109

National Gypsum

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0079
UL DESIGN: HW-D-0083


MIN. 4 1/2" THICK REINFORCED CONCRETE
3/4" MAX.
FIRESTOP SEALANT
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 1HR
UL DESIGN: U465
UL DESIGN: V438

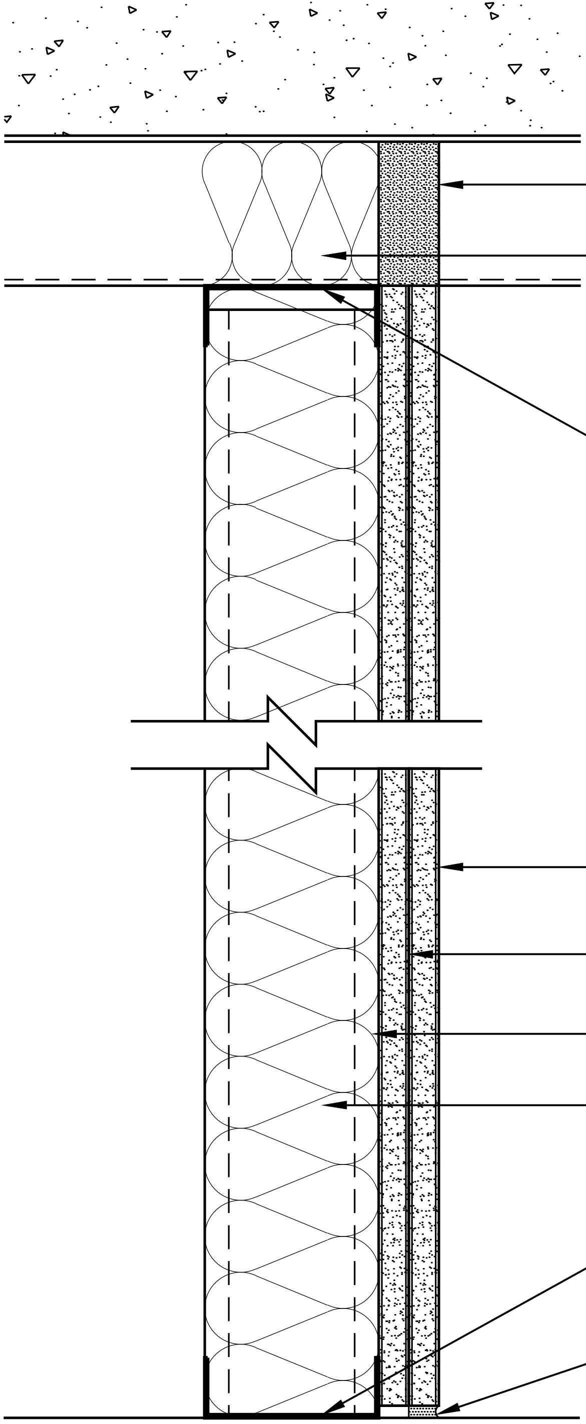
DATE: 11/05/13

1 HOUR PARTITION TO CONCRETE SLAB

SCALE: 3"=1'-0"

DETAIL: SS 110

National Gypsum

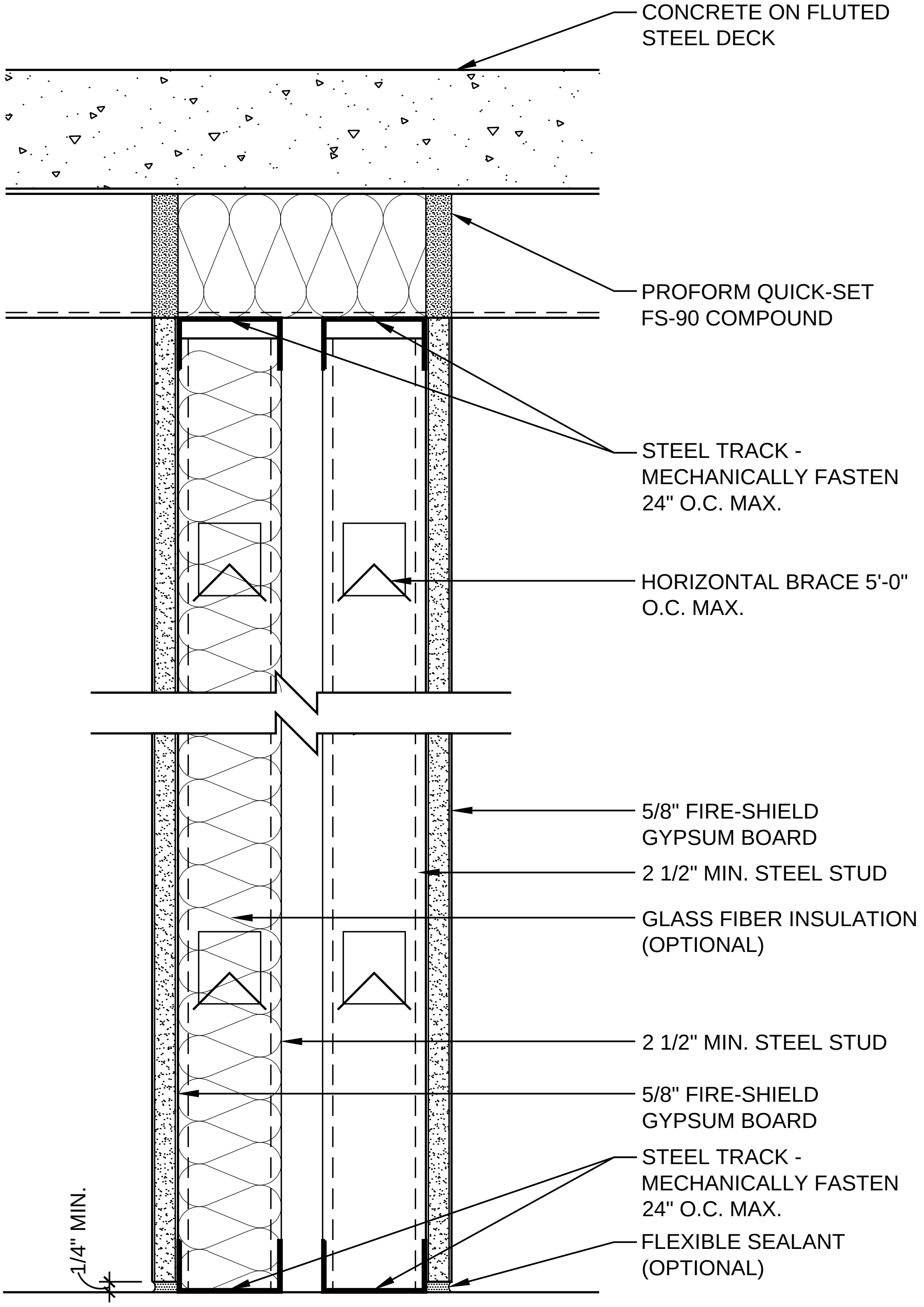

CONCRETE ON FLUTED STEEL DECK
1 1/4" PROFORM QUICK-SET FS-90 COMPOUND
GLASS FIBER INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
PROFORM QUICK-SET SETTING COMPOUND
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)

HEAD OF WALL - 1 HR
WHI-495-PSV-1325

PARTITION - 1 HR
UL DESIGN: V497

PARTITION RATED
FROM BOTH SIDES

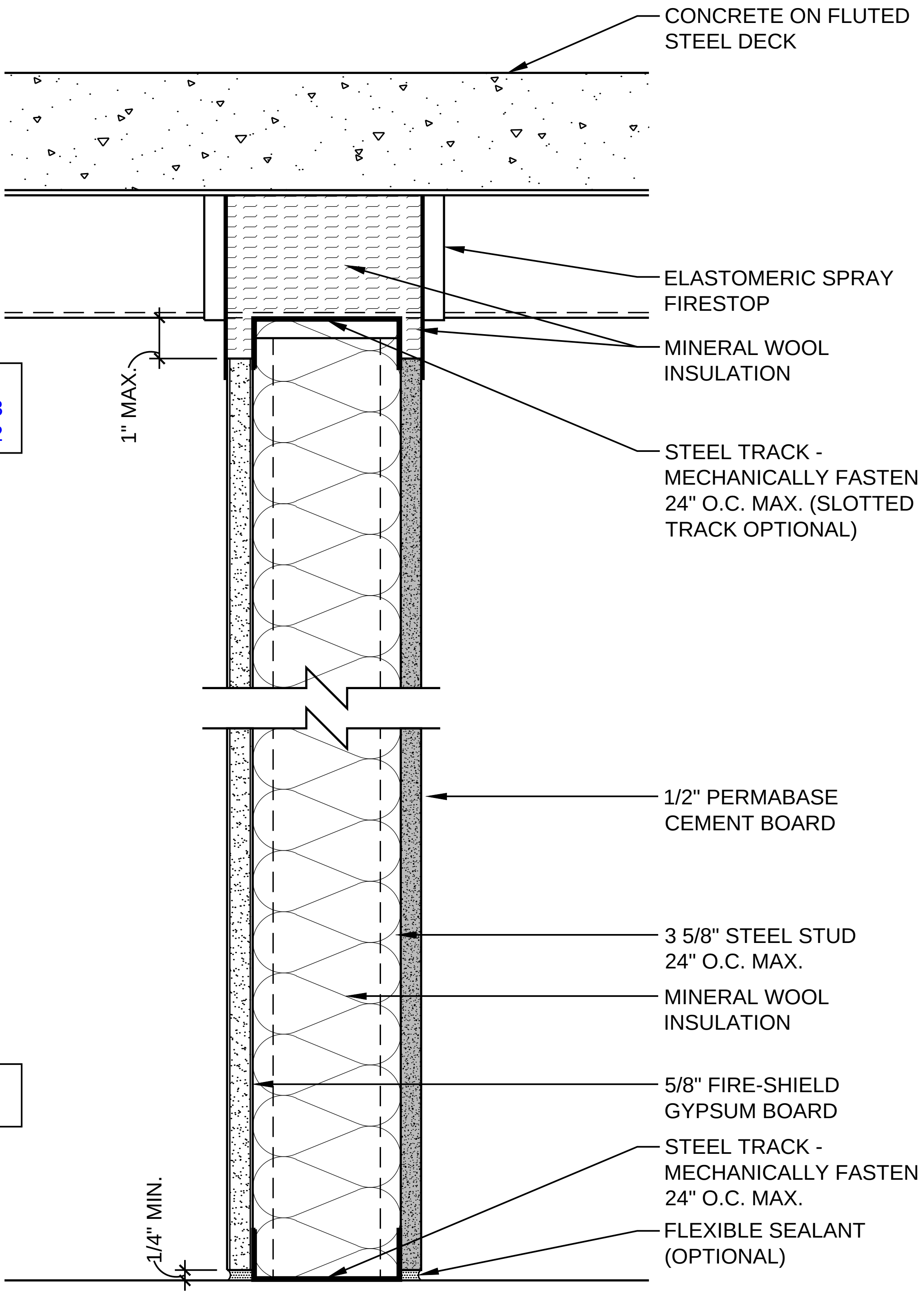
DATE: 11/05/13	1 HOUR 1 SIDED PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 111	


CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
HORIZONTAL BRACE 5'-0" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
2 1/2" MIN. STEEL STUD
GLASS FIBER INSULATION (OPTIONAL)
2 1/2" MIN. STEEL STUD
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
WHI 495-PSV-1067

PARTITION - 1 HR
UL DESIGN: V488

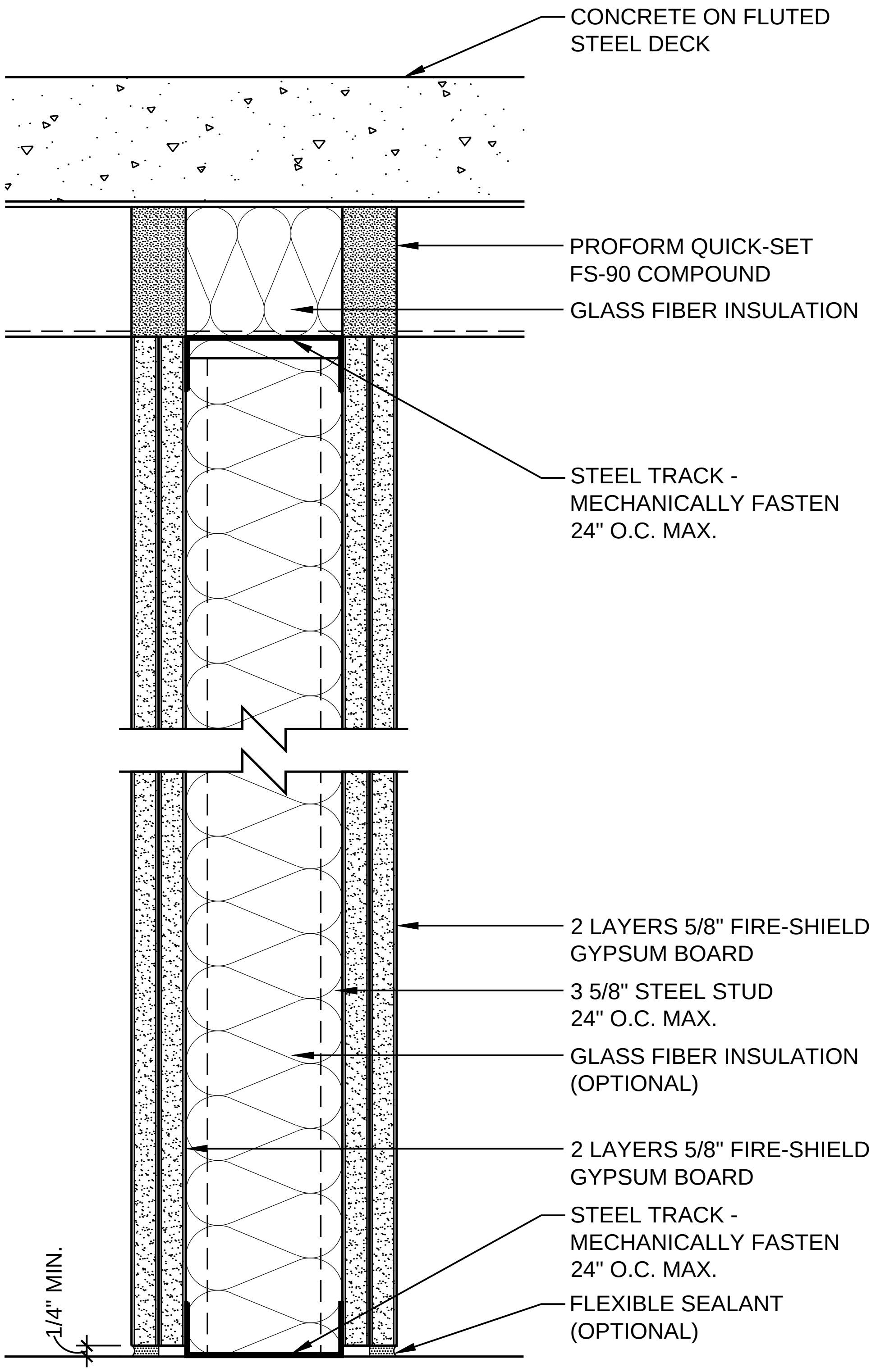
DATE: 11/05/13	1 HOUR CHASE WALL TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 112	


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
1" MAX.
1/2" PERMABASE CEMENT BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
MINERAL WOOL INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292

PARTITION - 1 HR
UL DESIGN: V452

DATE: 11/05/13	1 HOUR CEMENT BOARD PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 113	


CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
GLASS FIBER INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

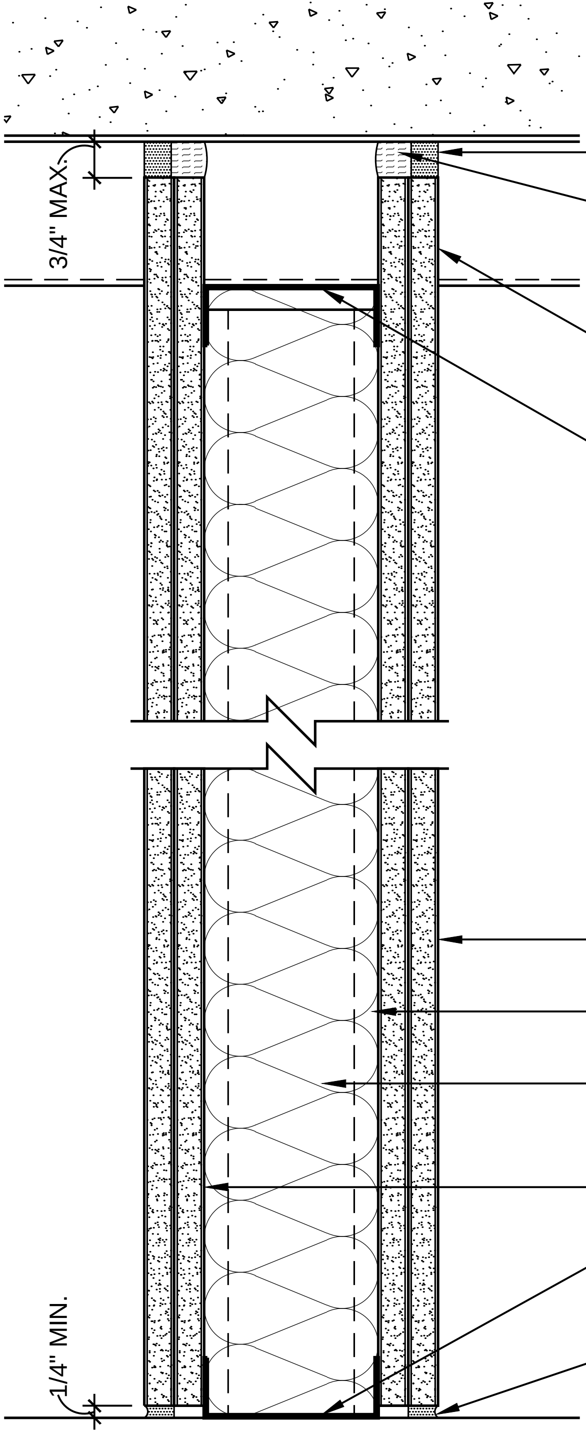
HEAD OF WALL - 2 HR
WHI 495-PSV-1068

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK	National Gypsum®
SCALE: 3"=1'-0"	DETAIL: SS 201	

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0103
UL DESIGN: HW-D-0076

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438



CONCRETE ON FLUTED STEEL DECK

FIRESTOP SEALANT

POLYETHYLENE BACKER ROD, GLASS FIBER INSULATION, OR MINERAL WOOL INSULATION

CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION

STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)

2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

3 5/8" STEEL STUD 24" O.C. MAX.

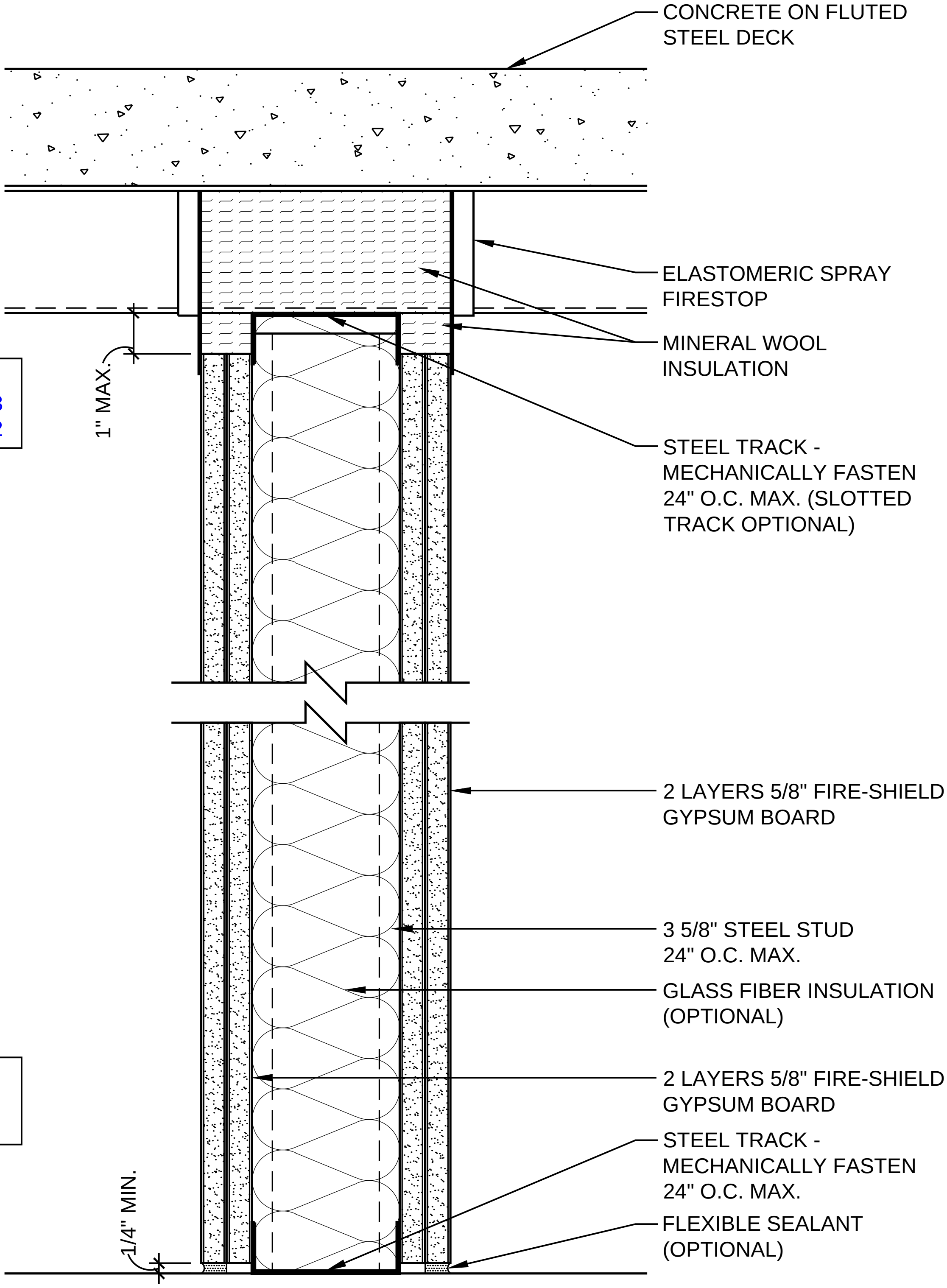
GLASS FIBER INSULATION (OPTIONAL)

2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.

FLEXIBLE SEALANT (OPTIONAL)

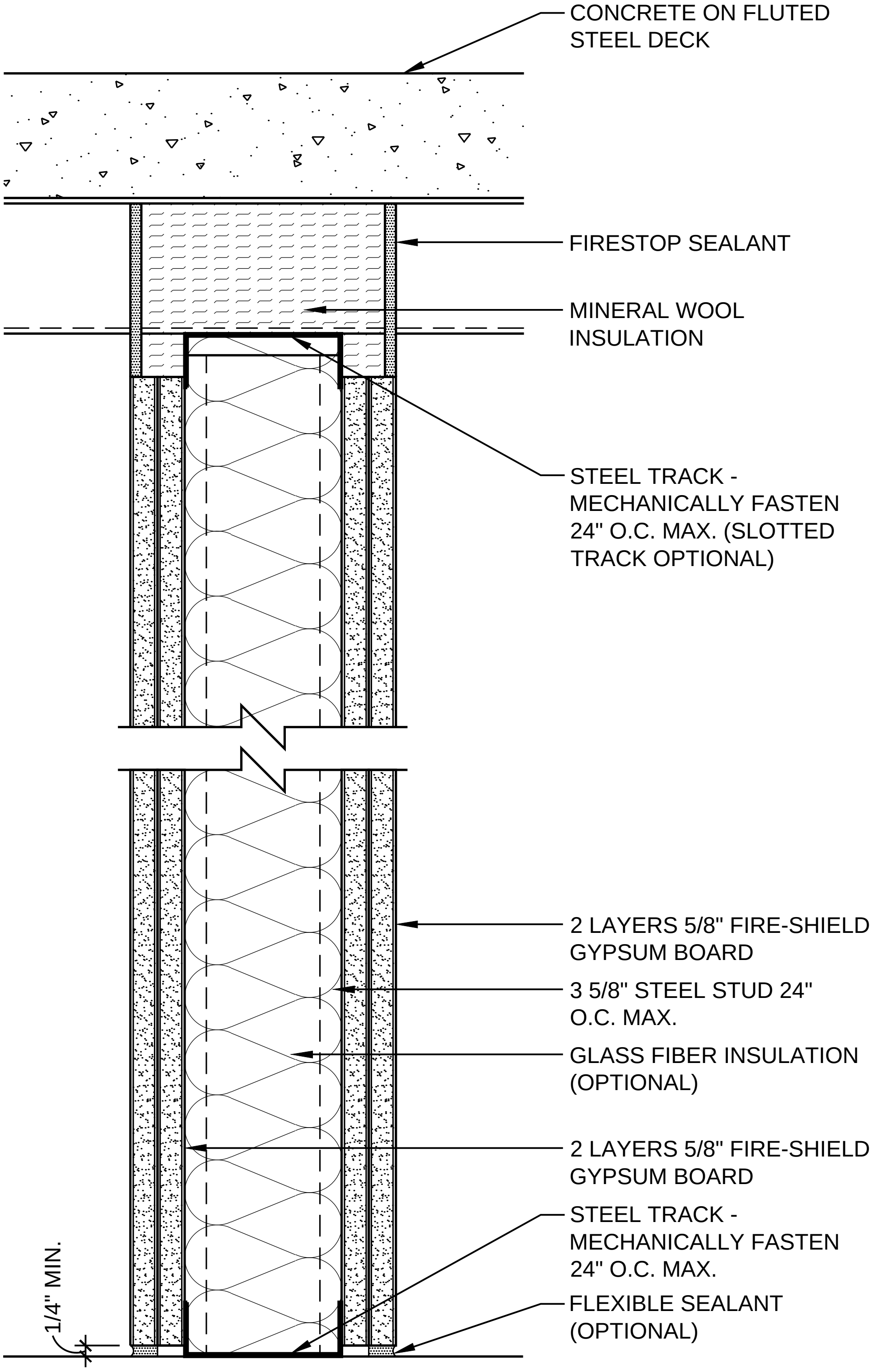
DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 202	


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
1" MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 203	


CONCRETE ON FLUTED STEEL DECK
FIRESTOP SEALANT
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

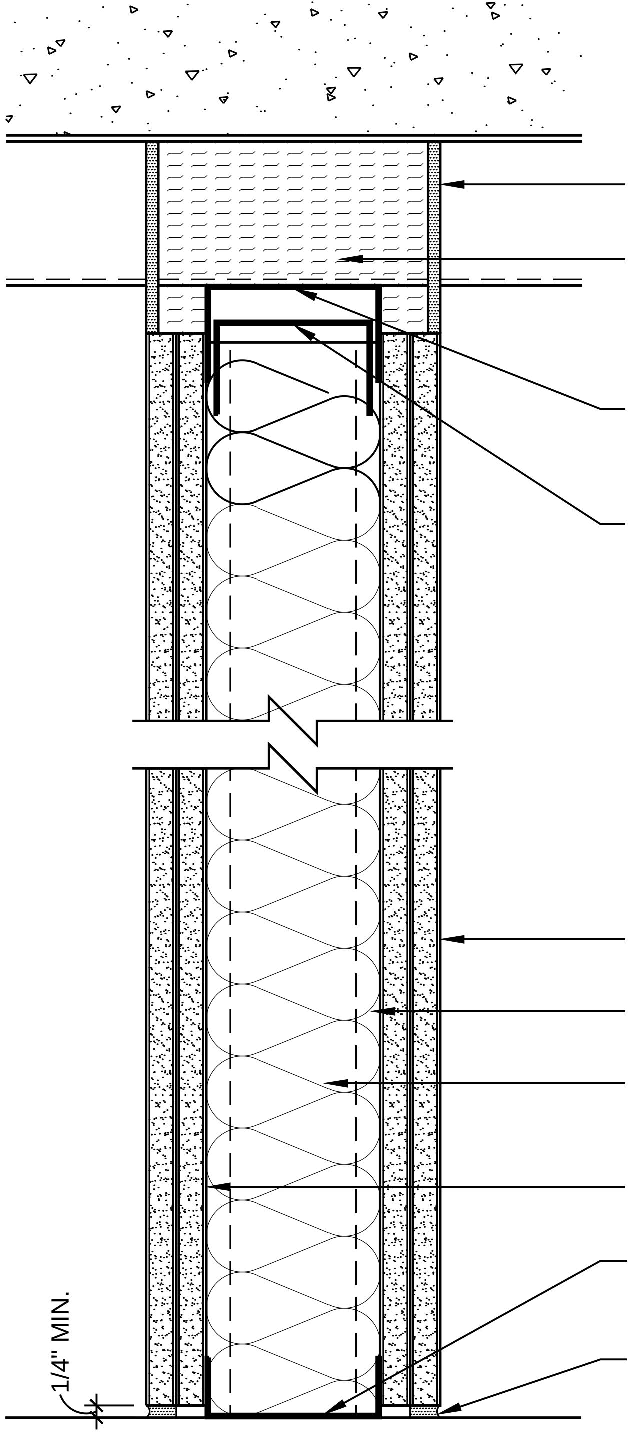
HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0034
UL DESIGN: HW-D-0045

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 204	

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0034
UL DESIGN: HW-D-0045

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438



CONCRETE ON FLUTED STEEL DECK

FIRESTOP SEALANT

MINERAL WOOL INSULATION

MECHANICALLY FASTEN DEFLECTION TRACK 24" O.C. MAX. (OPTIONAL)

STEEL TRACK NESTED WITHIN DEFLECTION TRACK WITHOUT ATTACHMENT

2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

3 5/8" STEEL STUD 24" O.C. MAX.

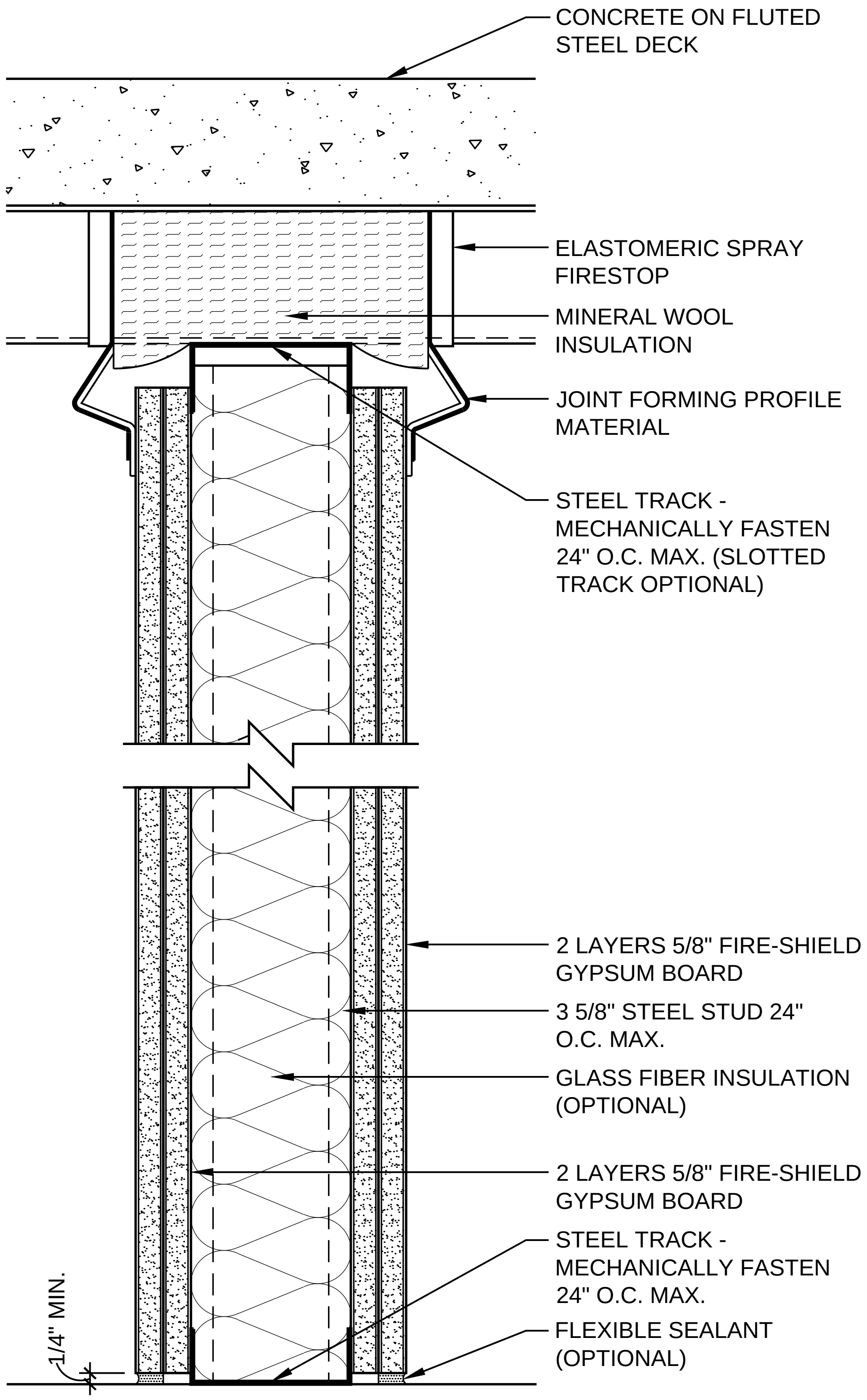
GLASS FIBER INSULATION (OPTIONAL)

2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.

FLEXIBLE SEALANT (OPTIONAL)

DATE: 11/05/13	2 HOUR PARTITION WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 205	

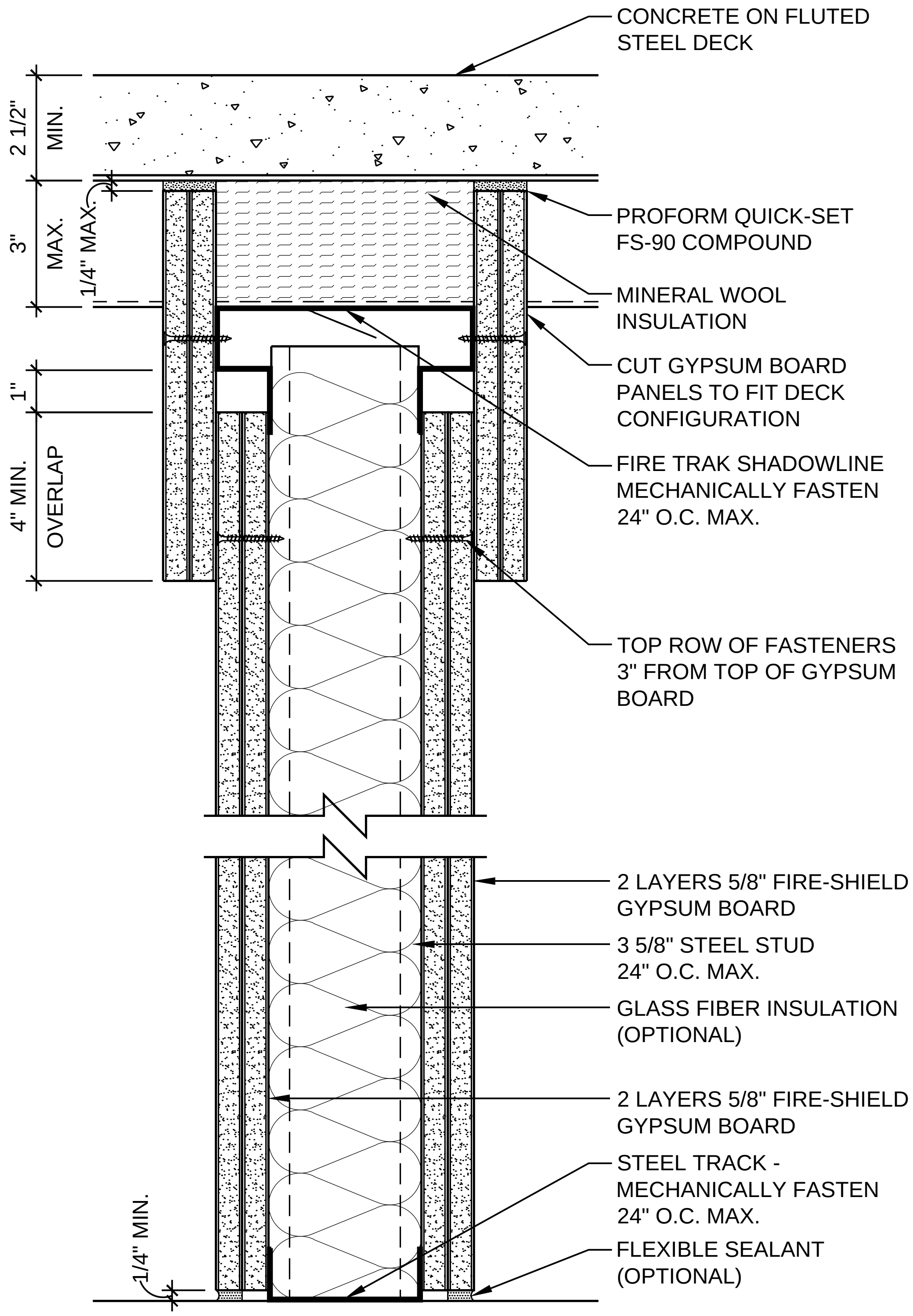

CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
JOINT FORMING PROFILE MATERIAL
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0363

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK
SCALE: 3"=1'-0"	DETAIL: SS 206

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0060

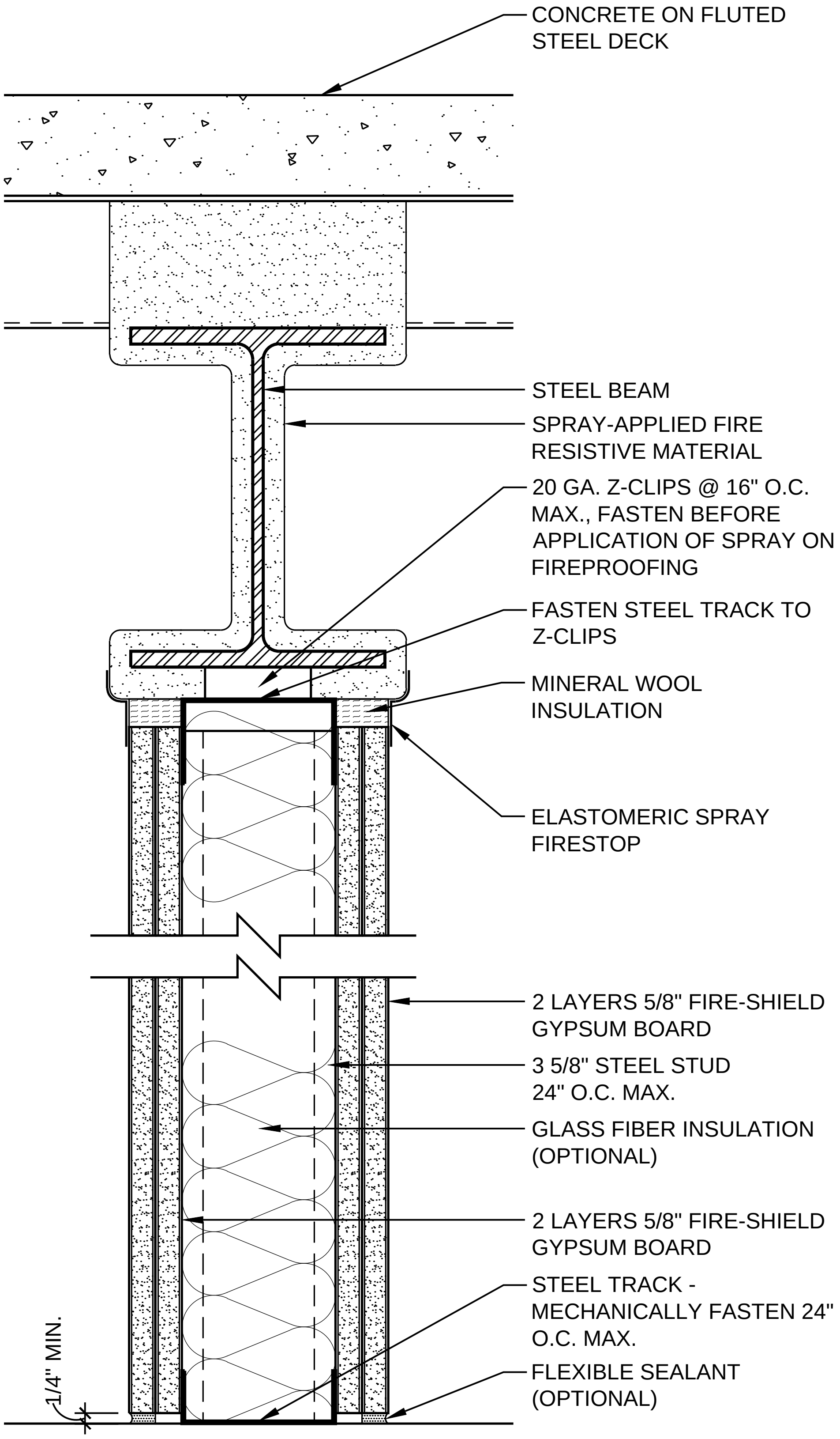

CONCRETE ON FLUTED STEEL DECK
2 1/2" MIN.
3" MAX.
1/4" MAX.
PROFORM QUICK-SET FS-90 COMPOUND
MINERAL WOOL INSULATION
CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION
1"
4" MIN. OVERLAP
FIRE TRAK SHADOWLINE MECHANICALLY FASTEN 24" O.C. MAX.
TOP ROW OF FASTENERS 3" FROM TOP OF GYPSUM BOARD
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13
SCALE: 3"=1'-0"

2 HOUR PARTITION WITH DEFLECTION TRACK

DETAIL: SS 207


CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
20 GA. Z-CLIPS @ 16" O.C. MAX., FASTEN BEFORE APPLICATION OF SPRAY ON FIREPROOFING
FASTEN STEEL TRACK TO Z-CLIPS
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

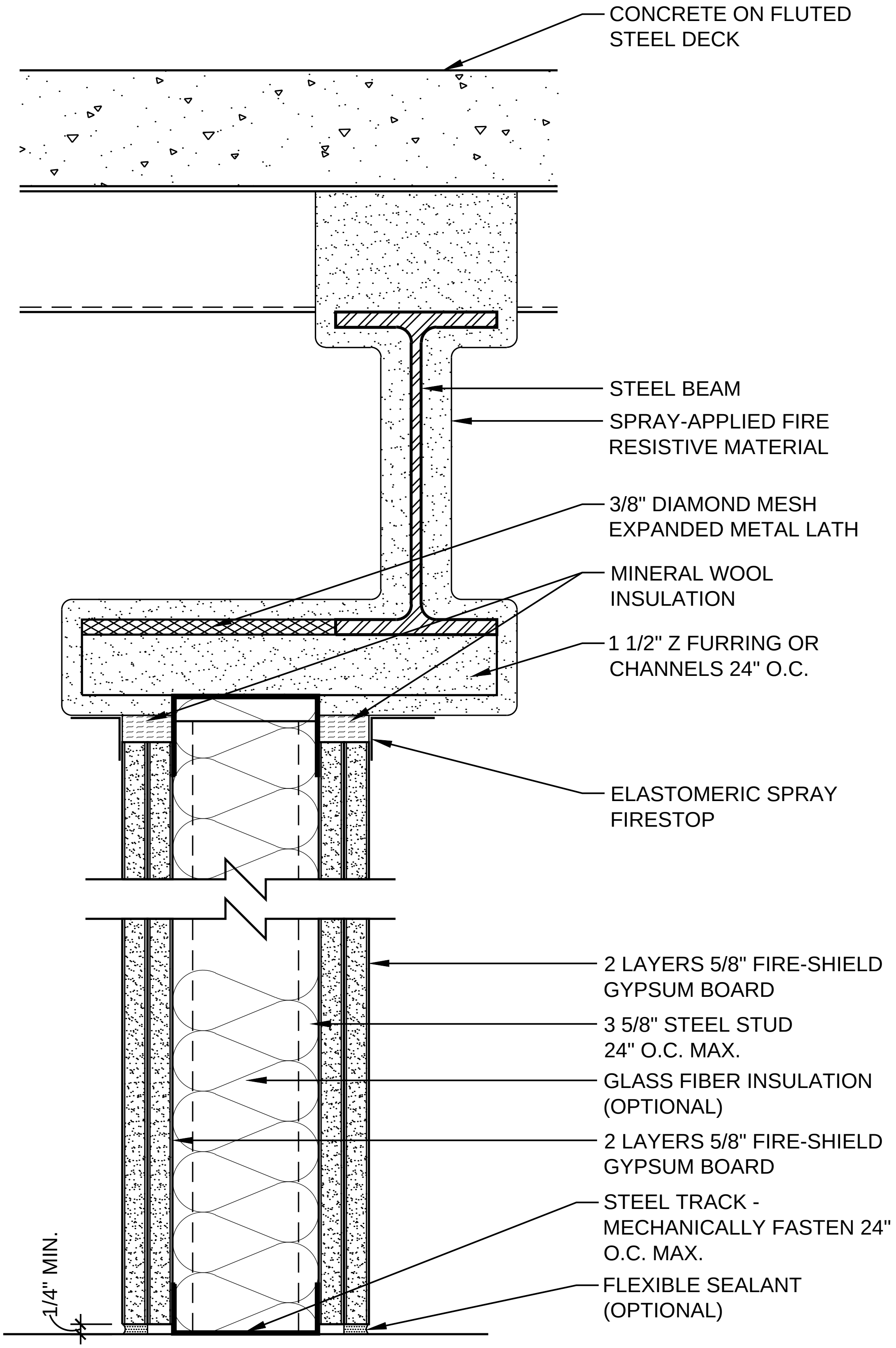
HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0252
UL DESIGN: HW-D-0259

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

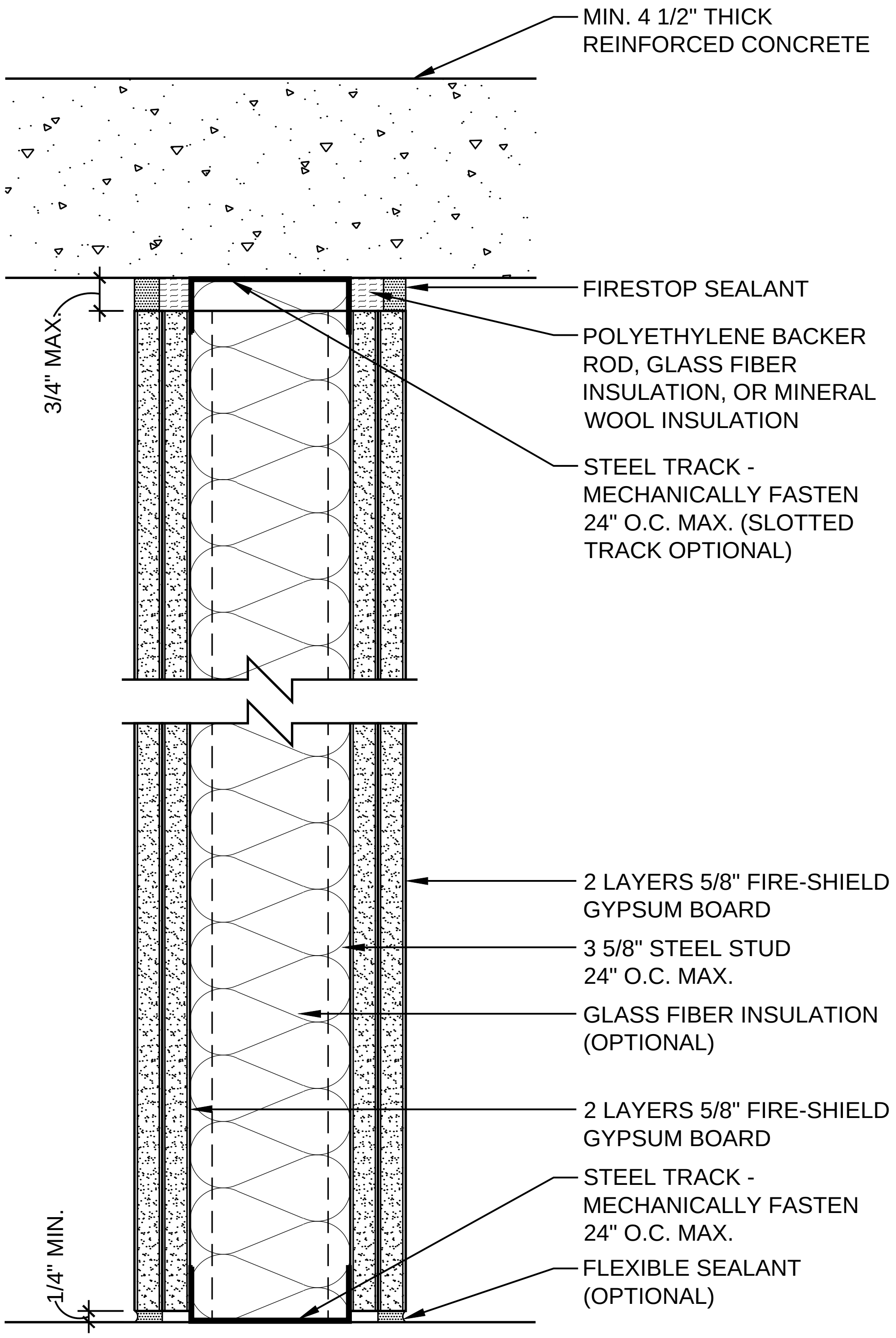
DATE: 11/05/13	2 HOUR PARTITION TO STEEL BEAM	National Gypsum®
SCALE: 3"=1'-0"	DETAIL: SS 208	

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0617
UL DESIGN: HW-D-0635

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438


CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
3/8" DIAMOND MESH EXPANDED METAL LATH
MINERAL WOOL INSULATION
1 1/2" Z FURRING OR CHANNELS 24" O.C.
ELASTOMERIC SPRAY FIRESTOP
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

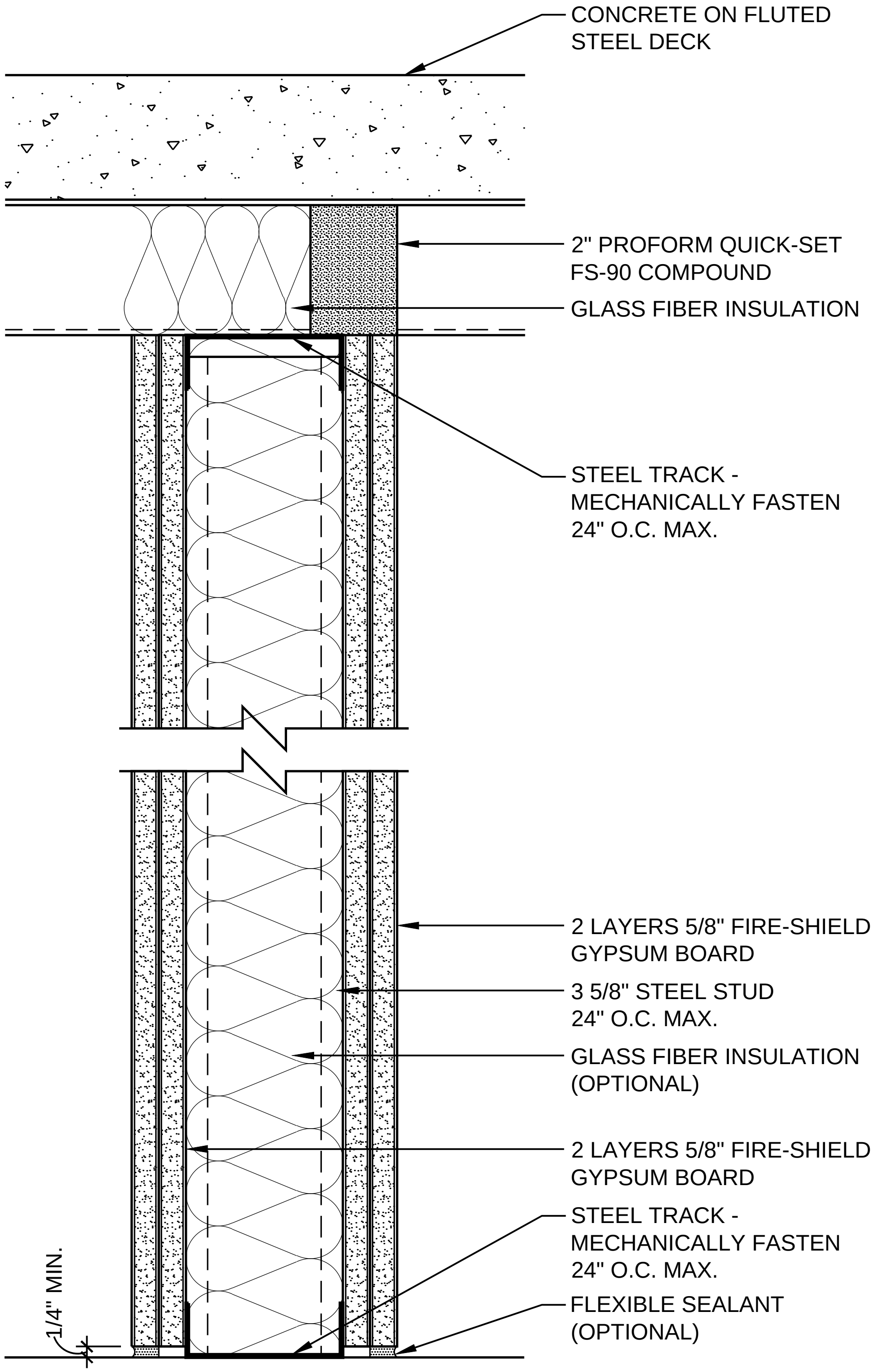
DATE: 11/05/13	2 HOUR PARTITION OFFSET FROM BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 209	


MIN. 4 1/2" THICK
REINFORCED CONCRETE
FIRESTOP SEALANT
POLYETHYLENE BACKER
ROD, GLASS FIBER
INSULATION, OR MINERAL
WOOL INSULATION
STEEL TRACK -
MECHANICALLY FASTEN
24" O.C. MAX. (SLOTTED
TRACK OPTIONAL)
3/4" MAX.
2 LAYERS 5/8" FIRE-SHIELD
GYPSUM BOARD
3 5/8" STEEL STUD
24" O.C. MAX.
GLASS FIBER INSULATION
(OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD
GYPSUM BOARD
STEEL TRACK -
MECHANICALLY FASTEN
24" O.C. MAX.
FLEXIBLE SEALANT
(OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0079
UL DESIGN: HW-D-0083

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO CONCRETE SLAB	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 210	

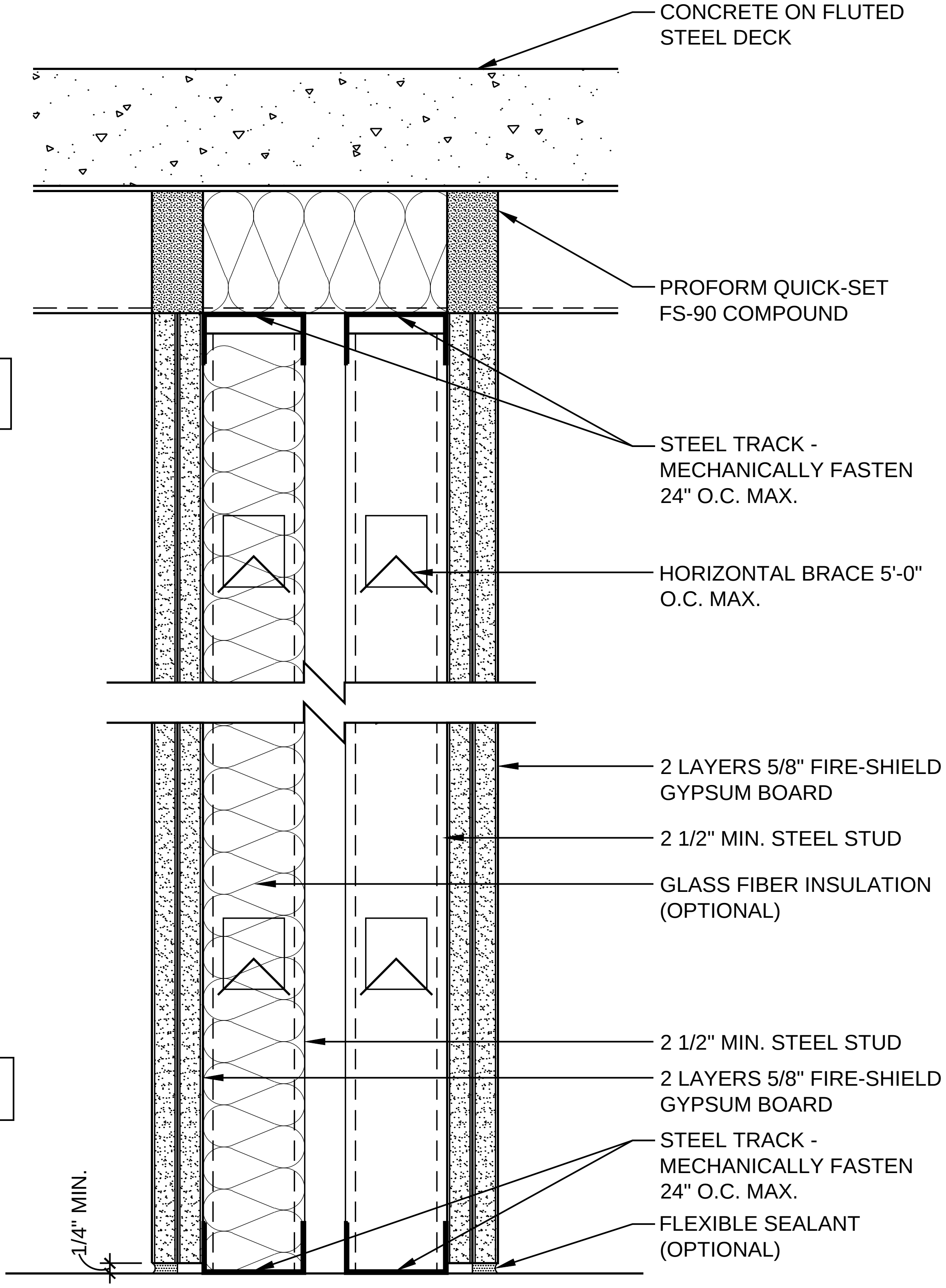

CONCRETE ON FLUTED STEEL DECK
2" PROFORM QUICK-SET FS-90 COMPOUND
GLASS FIBER INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
WHI-495-PSV-1326

HEAD OF WALL RATED FROM BOTH SIDES

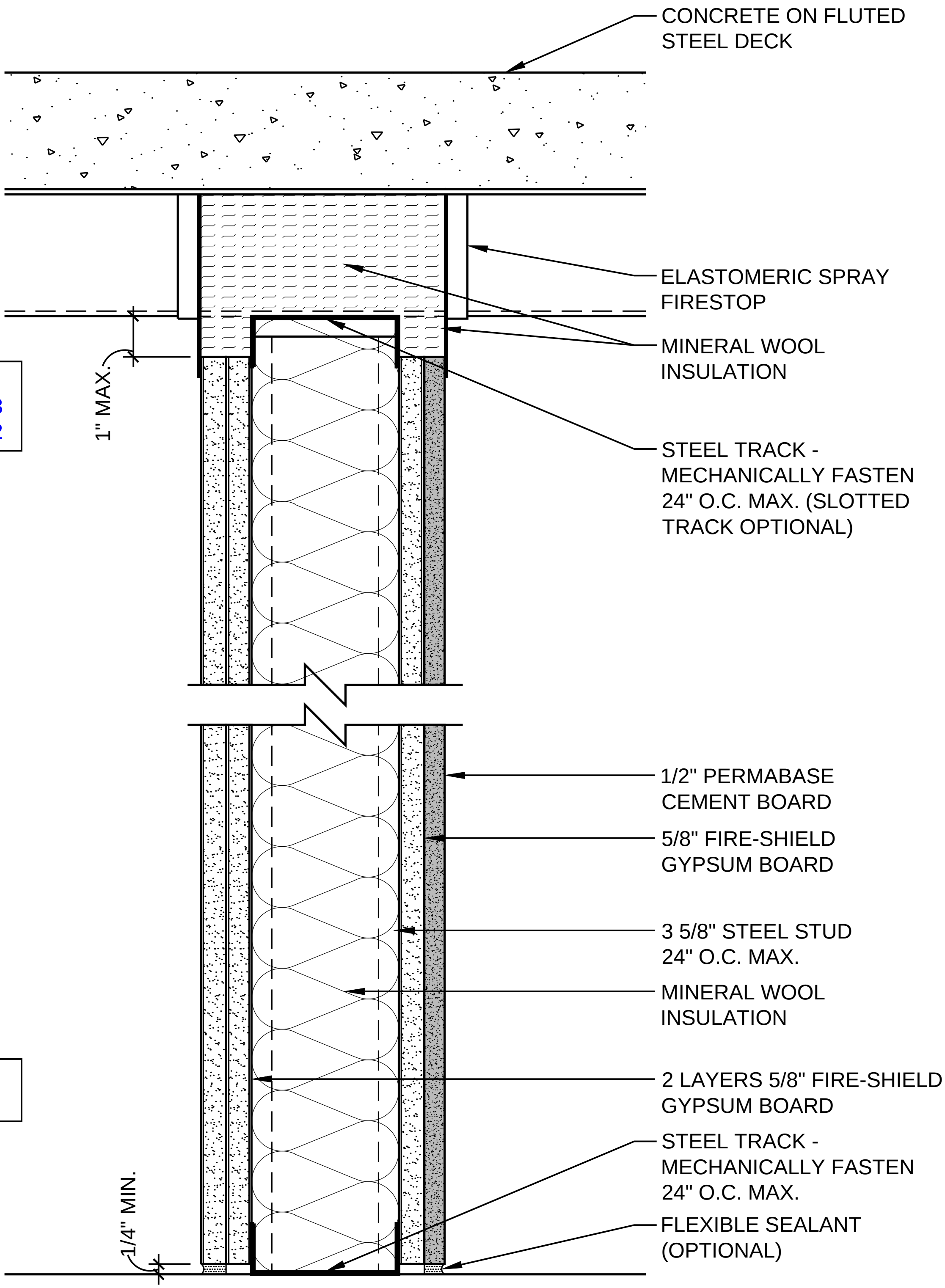
PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13	2 HOUR PARTITION TO STEEL DECK
SCALE: 3"=1'-0"	DETAIL: SS 211


CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
HEAD OF WALL - 2 HR
WHI 495-PSV-1068
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
HORIZONTAL BRACE 5'-0" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
2 1/2" MIN. STEEL STUD
GLASS FIBER INSULATION (OPTIONAL)
PARTITION - 2 HR
UL DESIGN: V488
2 1/2" MIN. STEEL STUD
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

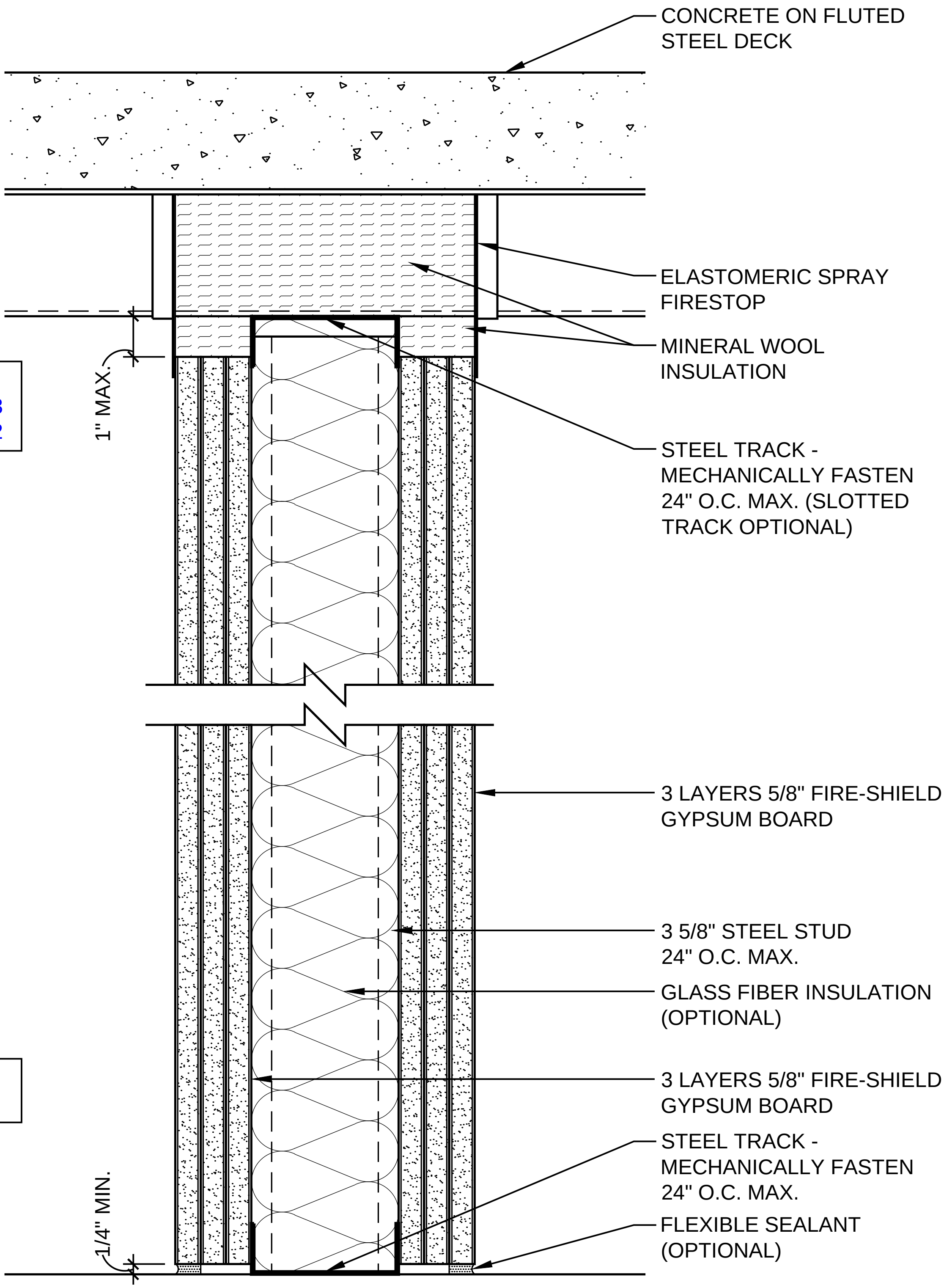
DATE: 11/05/13	2 HOUR CHASE WALL TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 212	

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
1" MAX.
1/2" PERMABASE CEMENT BOARD
5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
MINERAL WOOL INSULATION
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 2 HR
UL DESIGN: V452

DATE: 11/05/13	2 HOUR CEMENT BOARD PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 213	


CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
1" MAX.
3 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
3 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

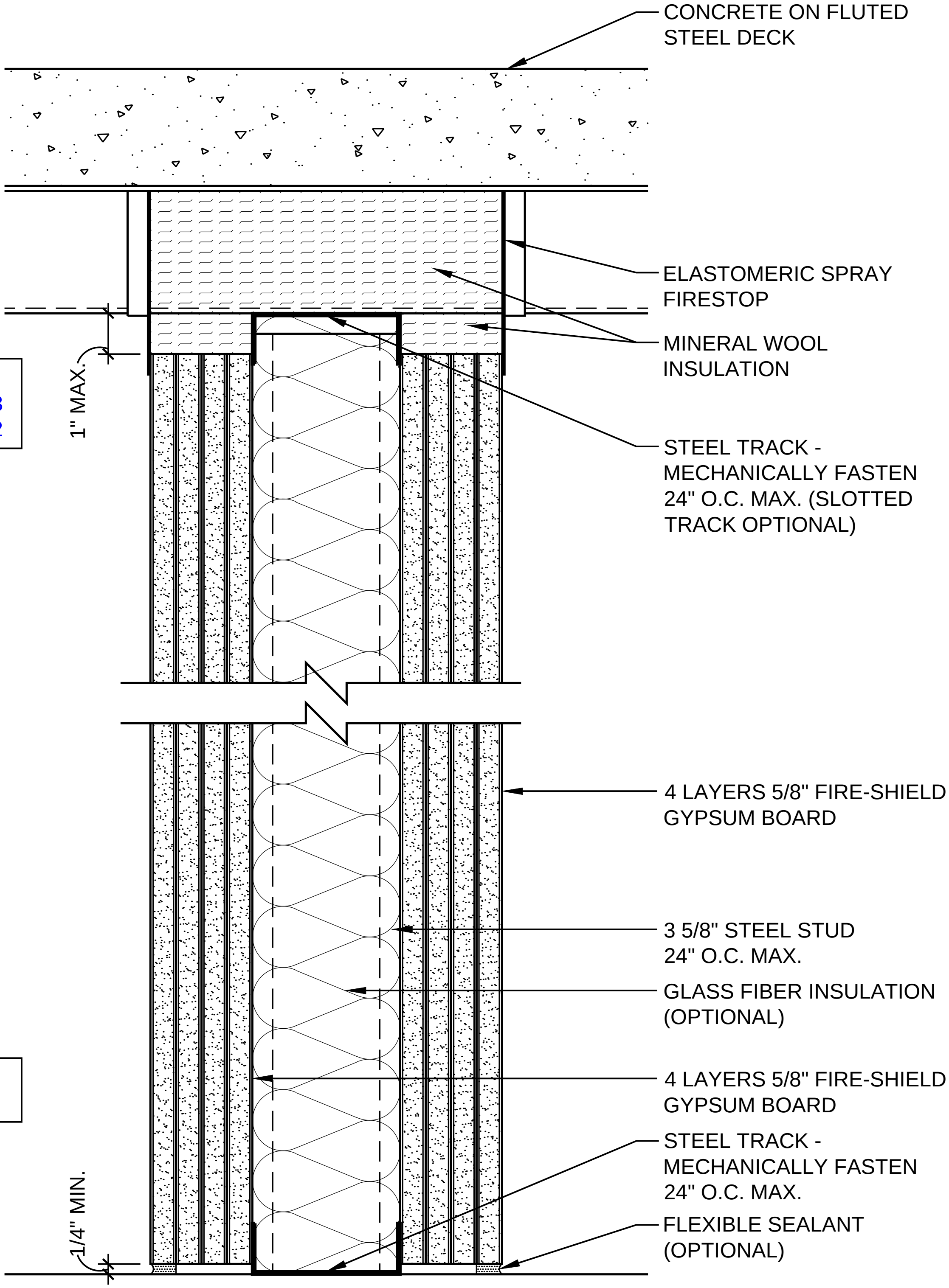
HEAD OF WALL - 3 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292

PARTITION - 3 HR
UL DESIGN: V438

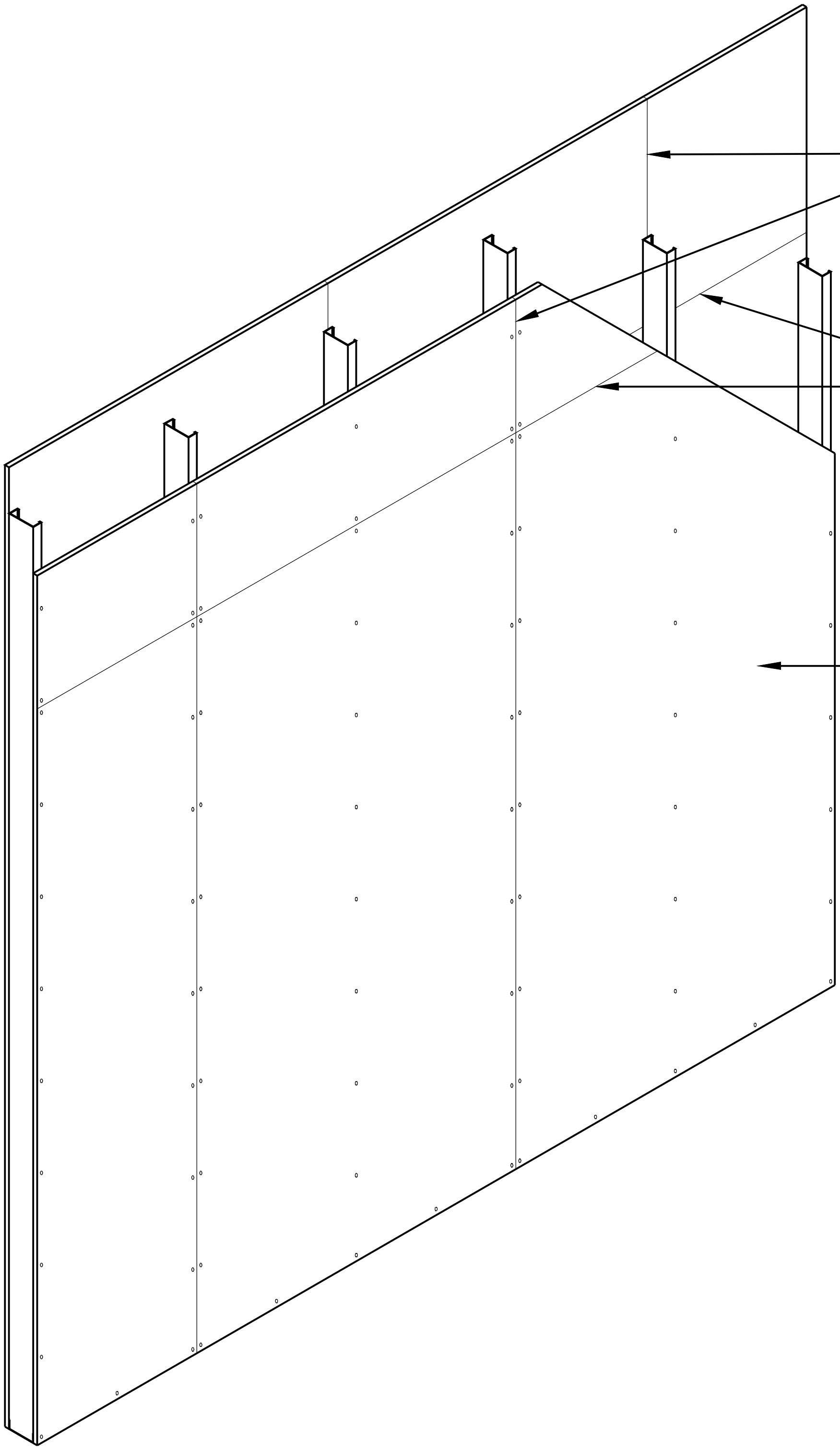
DATE: 11/05/13	3 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 301	

HEAD OF WALL - 4 HR
UL DESIGN: HW-D-0043
UL DESIGN: HW-D-0292

PARTITION - 4 HR
UL DESIGN: V438

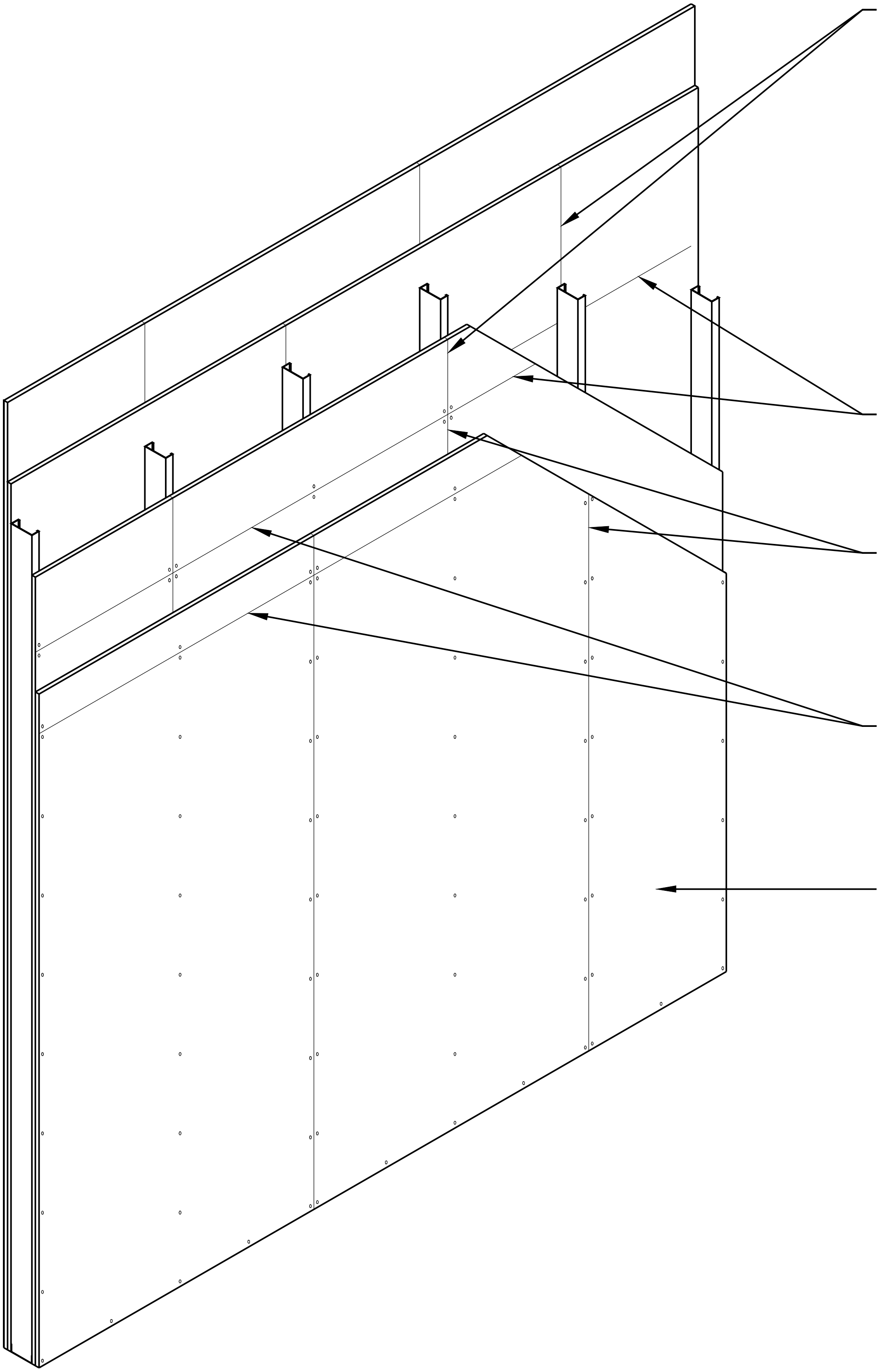

CONCRETE ON FLUTED STEEL DECK
ELASTOMERIC SPRAY FIRESTOP
MINERAL WOOL INSULATION
1" MAX.
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX. (SLOTTED TRACK OPTIONAL)
4 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" STEEL STUD 24" O.C. MAX.
GLASS FIBER INSULATION (OPTIONAL)
4 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1/4" MIN.
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)

DATE: 11/05/13	4 HOUR PARTITION TO STEEL DECK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 401	


VERTICAL JOINTS STAGGERED ONE STUD CAVITY ON OPPOSITE SIDES OF PARTITION
HORIZONTAL BASE LAYER JOINTS NEED NOT BE STAGGERED OR BACKED BY FRAMING
5/8" FIRE-SHIELD GYPSUM BOARD

PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HR PARTITION JOINT STAGGERING REQUIREMENTS	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: SS 501	



VERTICAL JOINTS STAGGERED ONE STUD ON OPPOSITE SIDES OF PARTITION

HORIZONTAL BASE LAYER JOINTS NEED NOT BE STAGGERED OR BACKED BY FRAMING

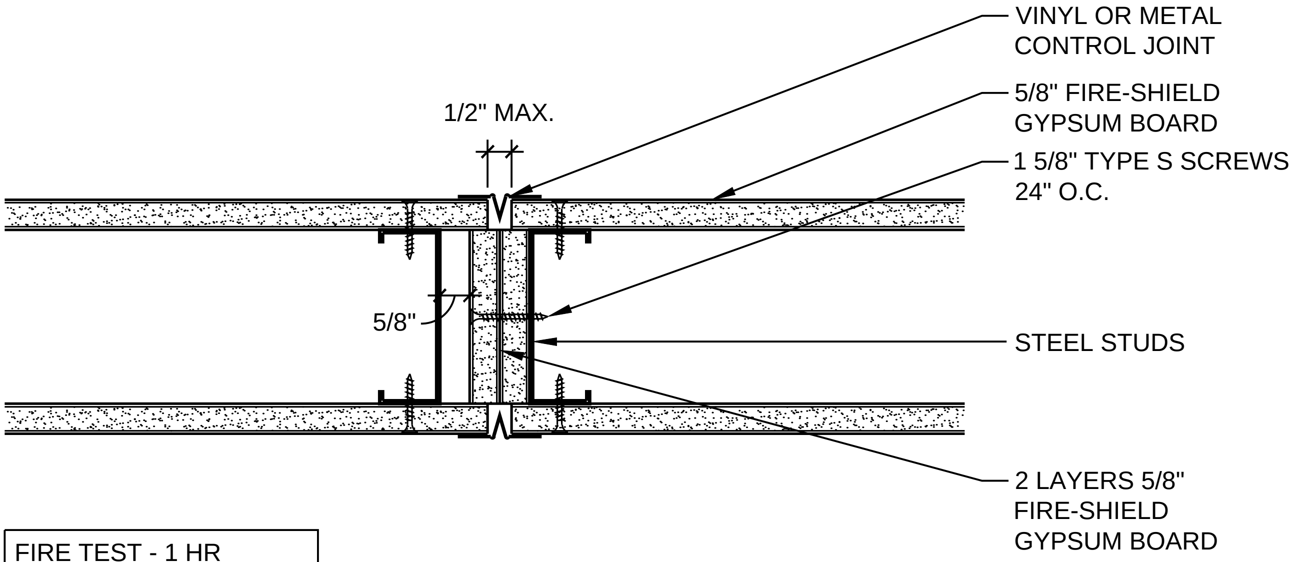
VERTICAL JOINTS STAGGERED ONE STUD CAVITY BETWEEN BASE AND FACE LAYERS

HORIZONTAL JOINTS STAGGERED 12" MIN. BETWEEN BASE AND FACE LAYERS

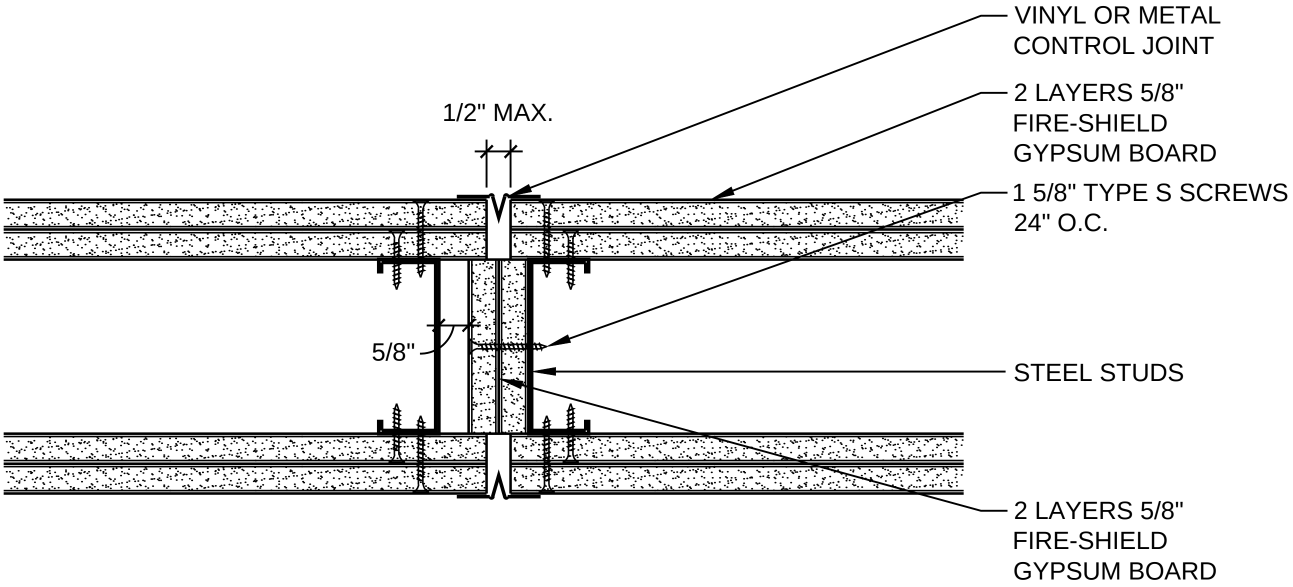
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

DATE: 11/05/13
2 HR PARTITION JOINT STAGGERING REQUIREMENTS
SCALE: 1/2"=1'-0"
DETAIL: SS 502
National Gypsum®

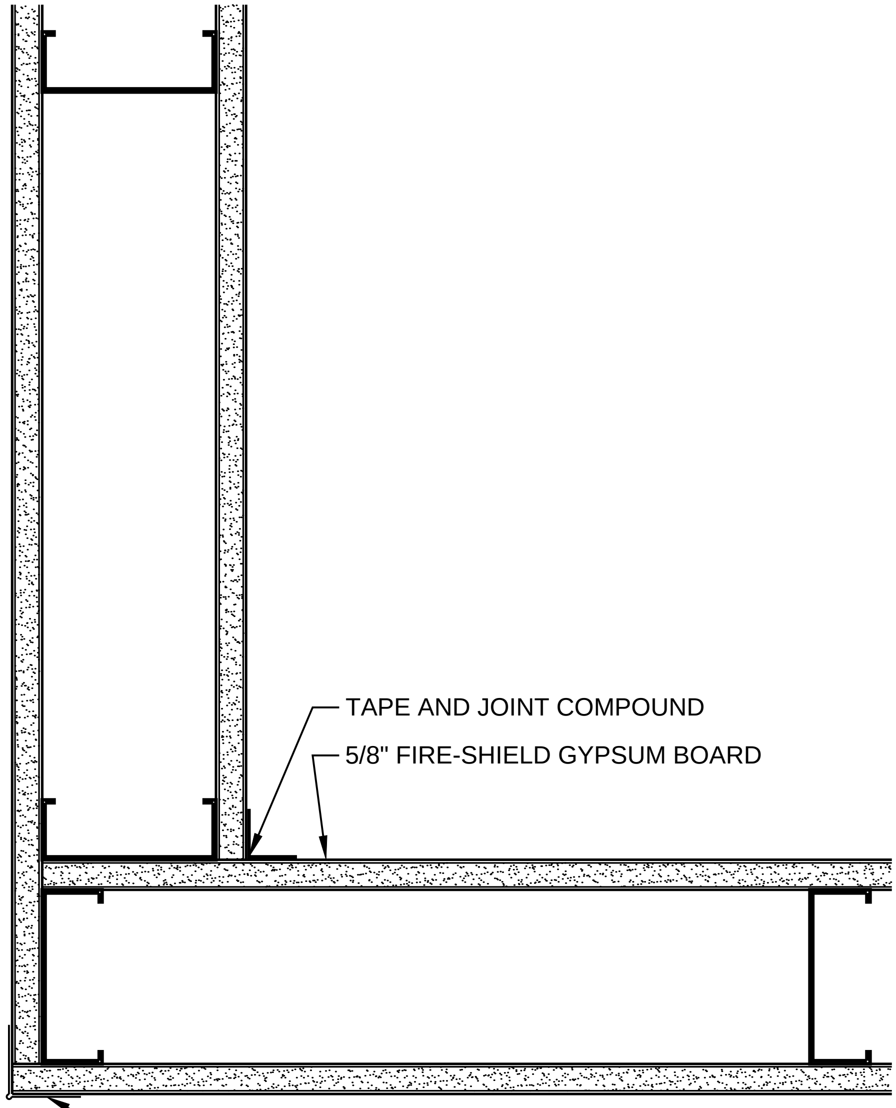

VINYL OR METAL CONTROL JOINT
5/8" FIRE-SHIELD GYPSUM BOARD
1 5/8" TYPE S SCREWS 24" O.C.
1/2" MAX.
5/8"
STEEL STUDS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

FIRE TEST - 1 HR
WHI-647-3024


VINYL OR METAL CONTROL JOINT
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1/2" MAX.
1 5/8" TYPE S SCREWS 24" O.C.
5/8"
STEEL STUDS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

FIRE TEST - 2 HR
WHI-651-0318.1

DATE: 11/05/13	CONTROL JOINTS FOR FIRE-RATED SYSTEMS	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 503	

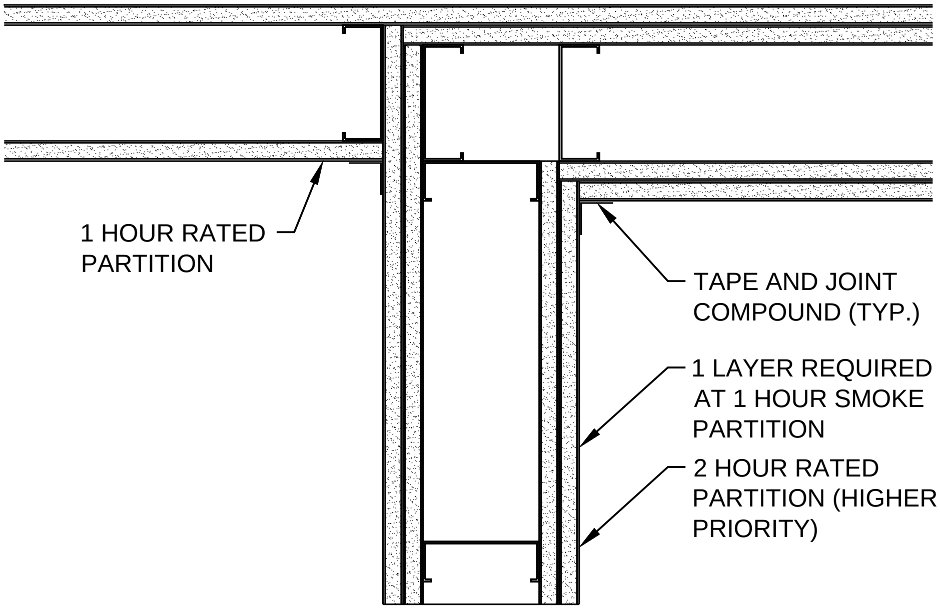

TAPE AND JOINT COMPOUND
5/8" FIRE-SHIELD GYPSUM BOARD
CORNER BEAD

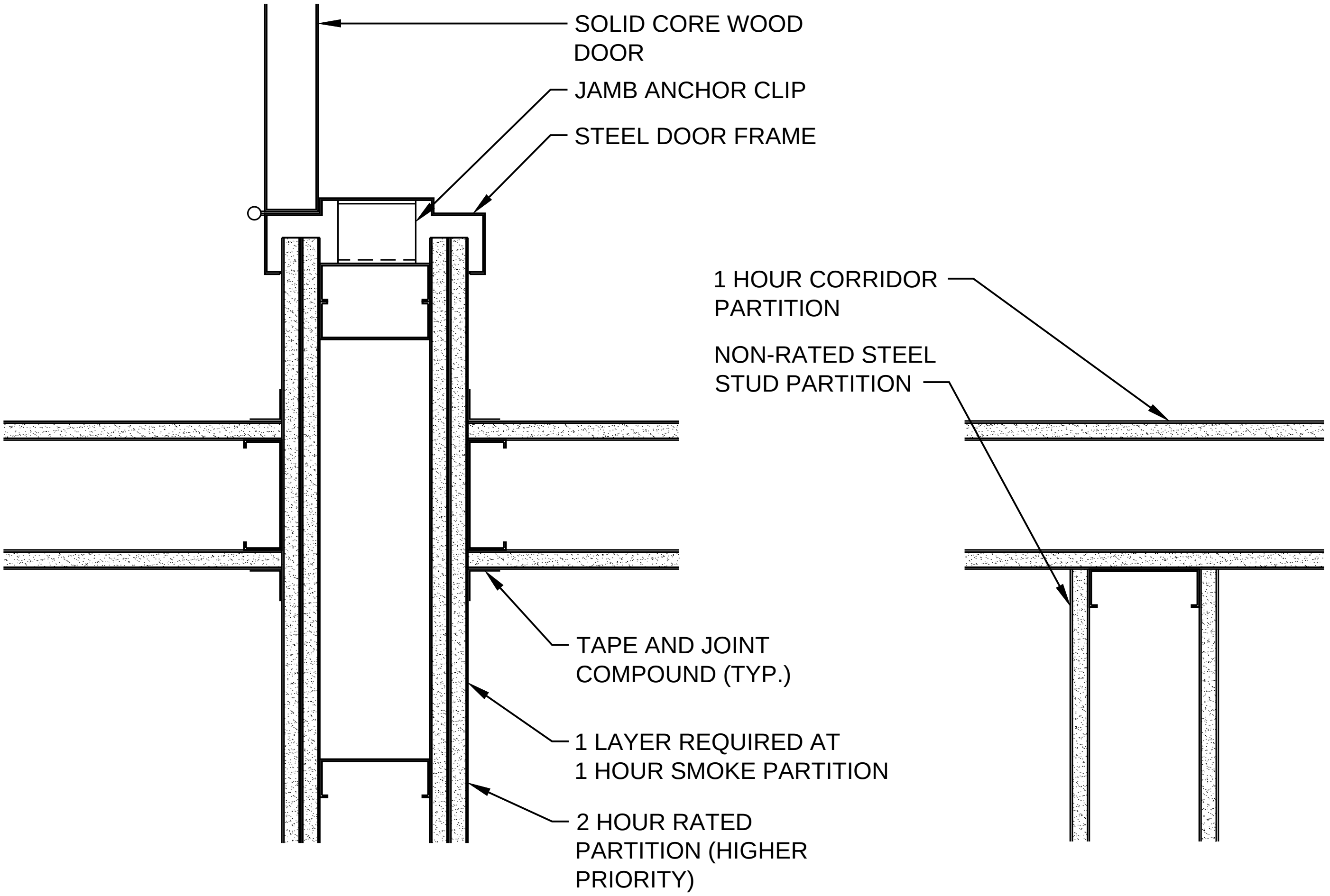
PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

DATE: 11/05/13	1 HOUR PARTITION CORNER DETAIL	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SS 504	

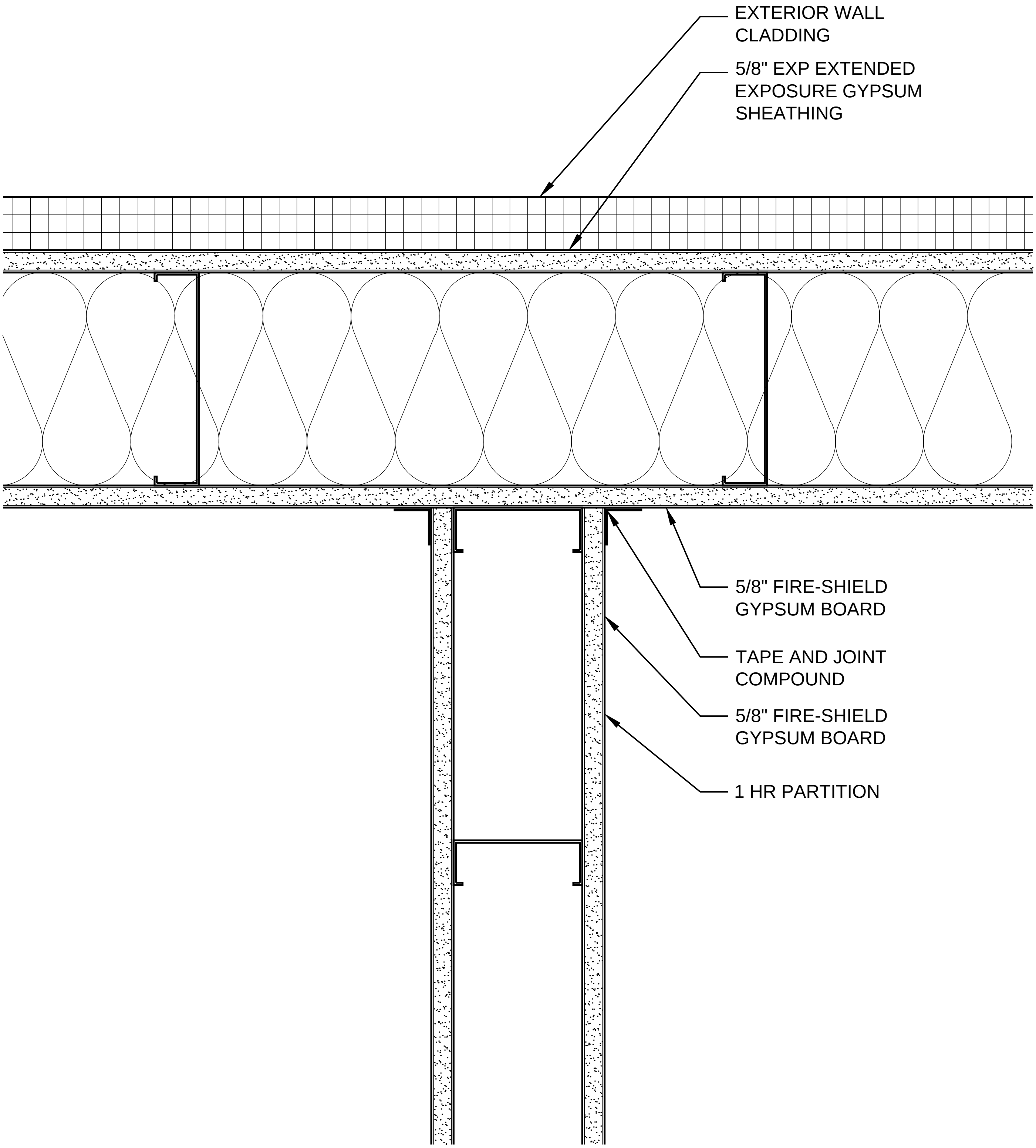
PARTITION - 1 HR
UL DESIGN: U465
UL DESIGN: V438

PARTITION - 2 HR
UL DESIGN: U411
UL DESIGN: V438

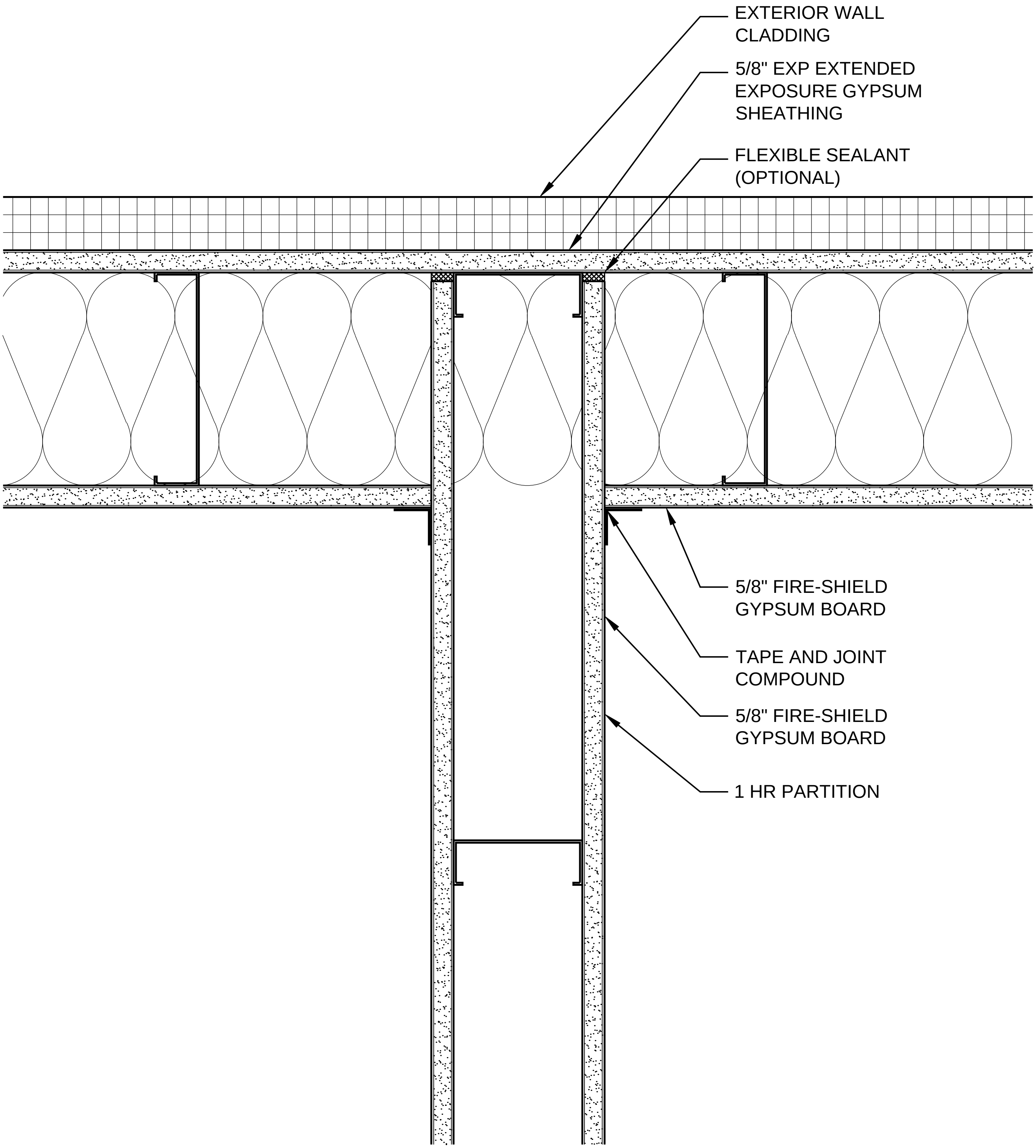

1 HOUR RATED PARTITION
TAPE AND JOINT COMPOUND (TYP.)
1 LAYER REQUIRED AT 1 HOUR SMOKE PARTITION
2 HOUR RATED PARTITION (HIGHER PRIORITY)


SOLID CORE WOOD DOOR
JAMB ANCHOR CLIP
STEEL DOOR FRAME
1 HOUR CORRIDOR PARTITION
NON-RATED STEEL STUD PARTITION
TAPE AND JOINT COMPOUND (TYP.)
1 LAYER REQUIRED AT 1 HOUR SMOKE PARTITION
2 HOUR RATED PARTITION (HIGHER PRIORITY)

DATE: 11/05/13	INTERSECTIONS OF RATED PARTITIONS
SCALE: 2"=1'-0"	DETAIL: SS 505


EXTERIOR WALL CLADDING
5/8" EXP EXTENDED EXPOSURE GYPSUM SHEATHING
5/8" FIRE-SHIELD GYPSUM BOARD
TAPE AND JOINT COMPOUND
5/8" FIRE-SHIELD GYPSUM BOARD
1 HR PARTITION

DATE: 11/05/13	1 HOUR PARTITION AT 1 HOUR EXTERIOR WALL	National Gypsum®
SCALE: 3"=1'-0"	DETAIL: SS 506	


EXTERIOR WALL CLADDING
5/8" EXP EXTENDED EXPOSURE GYPSUM SHEATHING
FLEXIBLE SEALANT (OPTIONAL)
5/8" FIRE-SHIELD GYPSUM BOARD
TAPE AND JOINT COMPOUND
5/8" FIRE-SHIELD GYPSUM BOARD
1 HR PARTITION

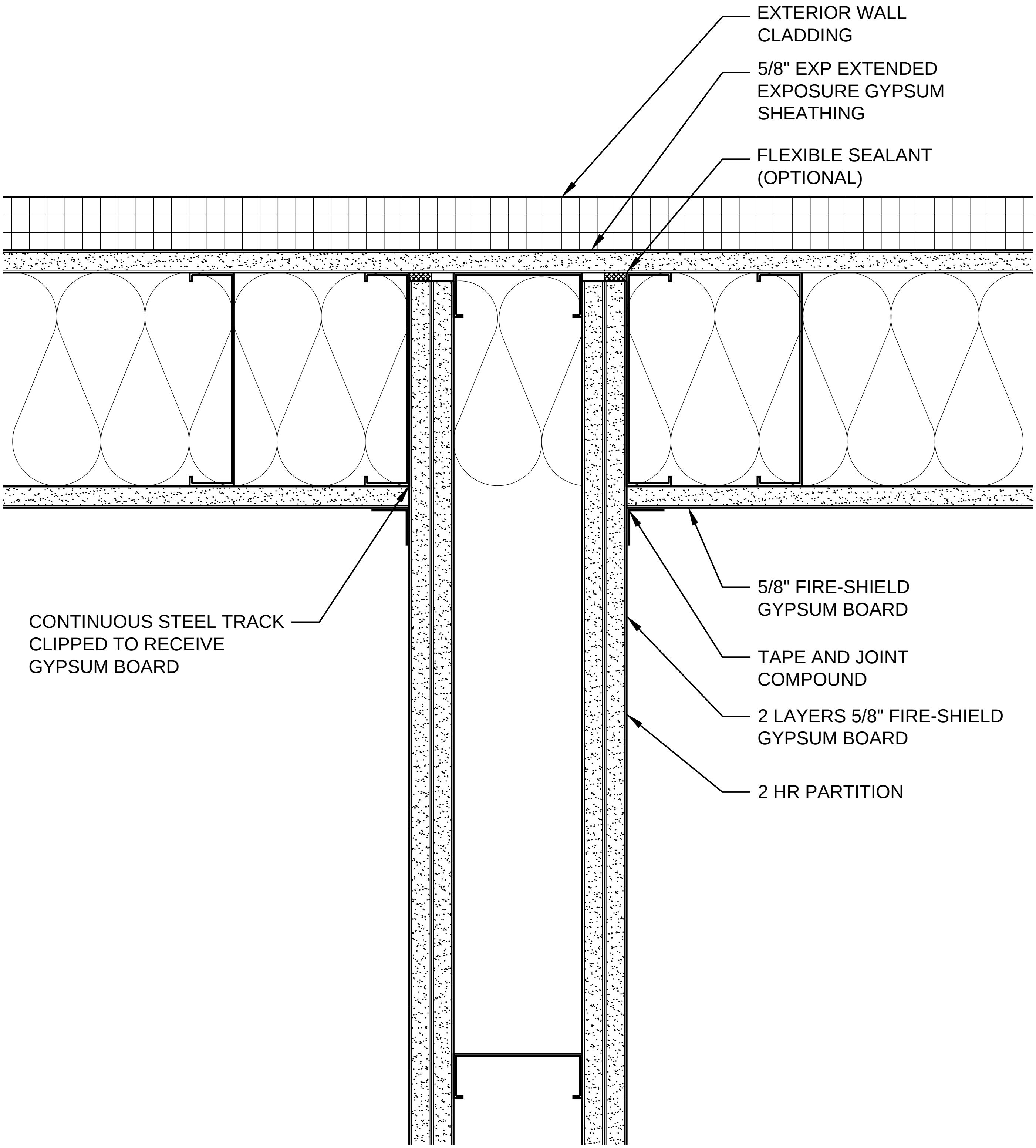
DATE: 11/05/13

1 HOUR PARTITION AT NON-RATED EXTERIOR WALL

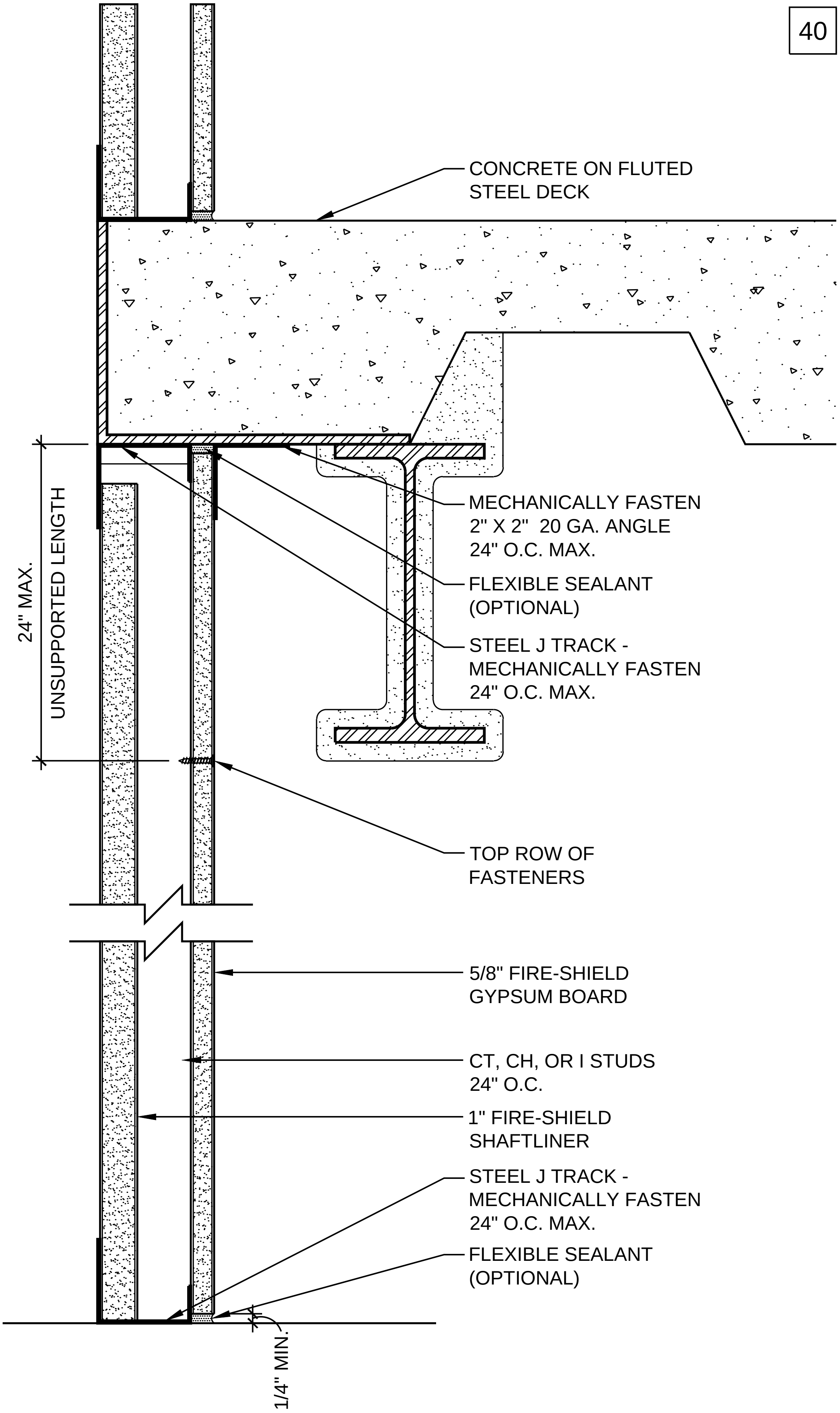
SCALE: 3"=1'-0"

DETAIL: SS 507

National Gypsum


EXTERIOR WALL CLADDING
5/8" EXP EXTENDED EXPOSURE GYPSUM SHEATHING
FLEXIBLE SEALANT (OPTIONAL)
CONTINUOUS STEEL TRACK CLIPPED TO RECEIVE GYPSUM BOARD
5/8" FIRE-SHIELD GYPSUM BOARD
TAPE AND JOINT COMPOUND
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
2 HR PARTITION

DATE: 11/05/13	2 HOUR PARTITION AT 1 HOUR EXTERIOR WALL	National Gypsum®
SCALE: 3"=1'-0"	DETAIL: SS 508	

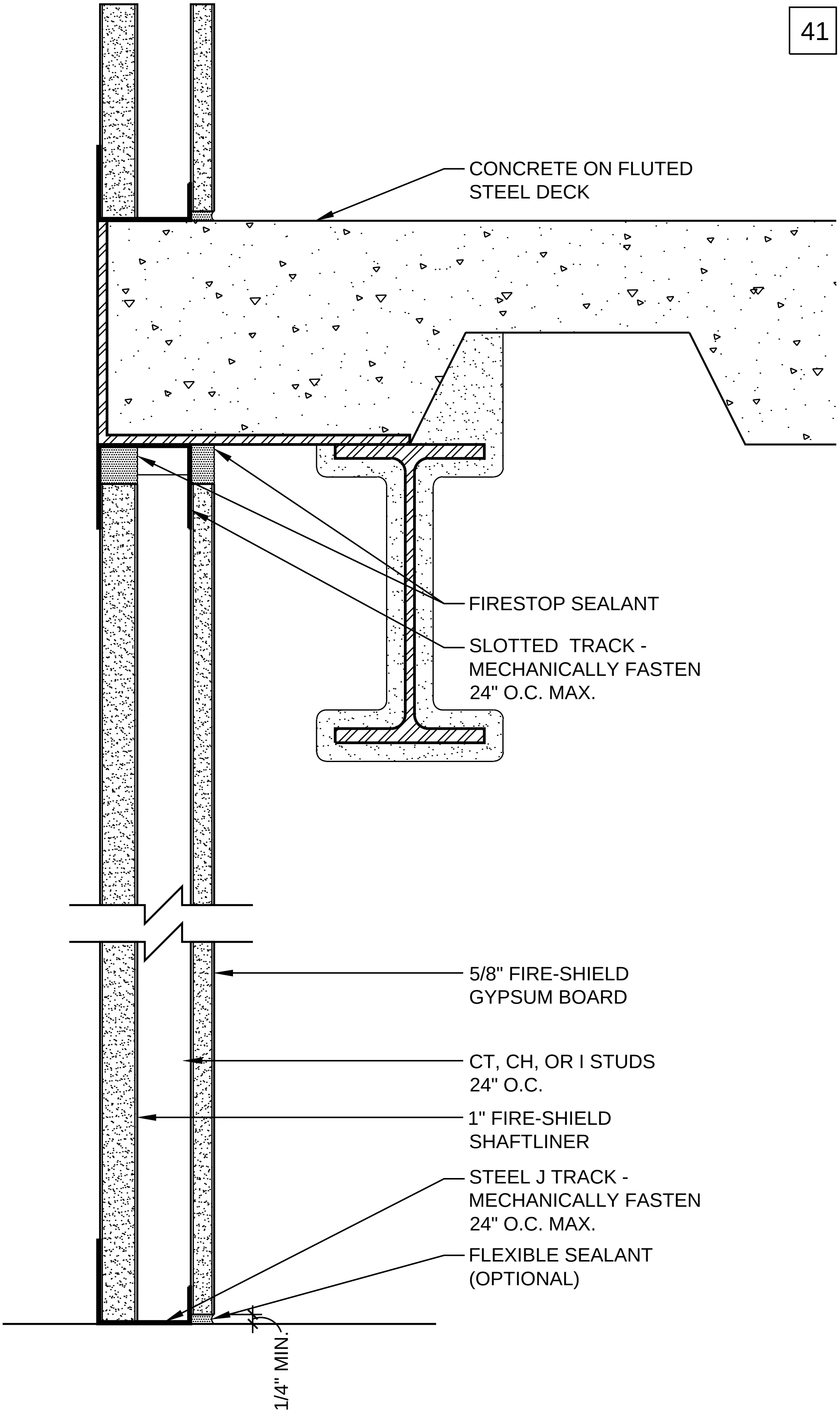

CONCRETE ON FLUTED
STEEL DECK
MECHANICALLY FASTEN
2" X 2" 20 GA. ANGLE
24" O.C. MAX.
FLEXIBLE SEALANT
(OPTIONAL)
STEEL J TRACK -
MECHANICALLY FASTEN
24" O.C. MAX.
24" MAX.
UNSUPPORTED LENGTH
TOP ROW OF
FASTENERS
5/8" FIRE-SHIELD
GYPSUM BOARD
CT, CH, OR I STUDS
24" O.C.
1" FIRE-SHIELD
SHAFTLINER
STEEL J TRACK -
MECHANICALLY FASTEN
24" O.C. MAX.
FLEXIBLE SEALANT
(OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
FMJ.I.1J6Q8.AC

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

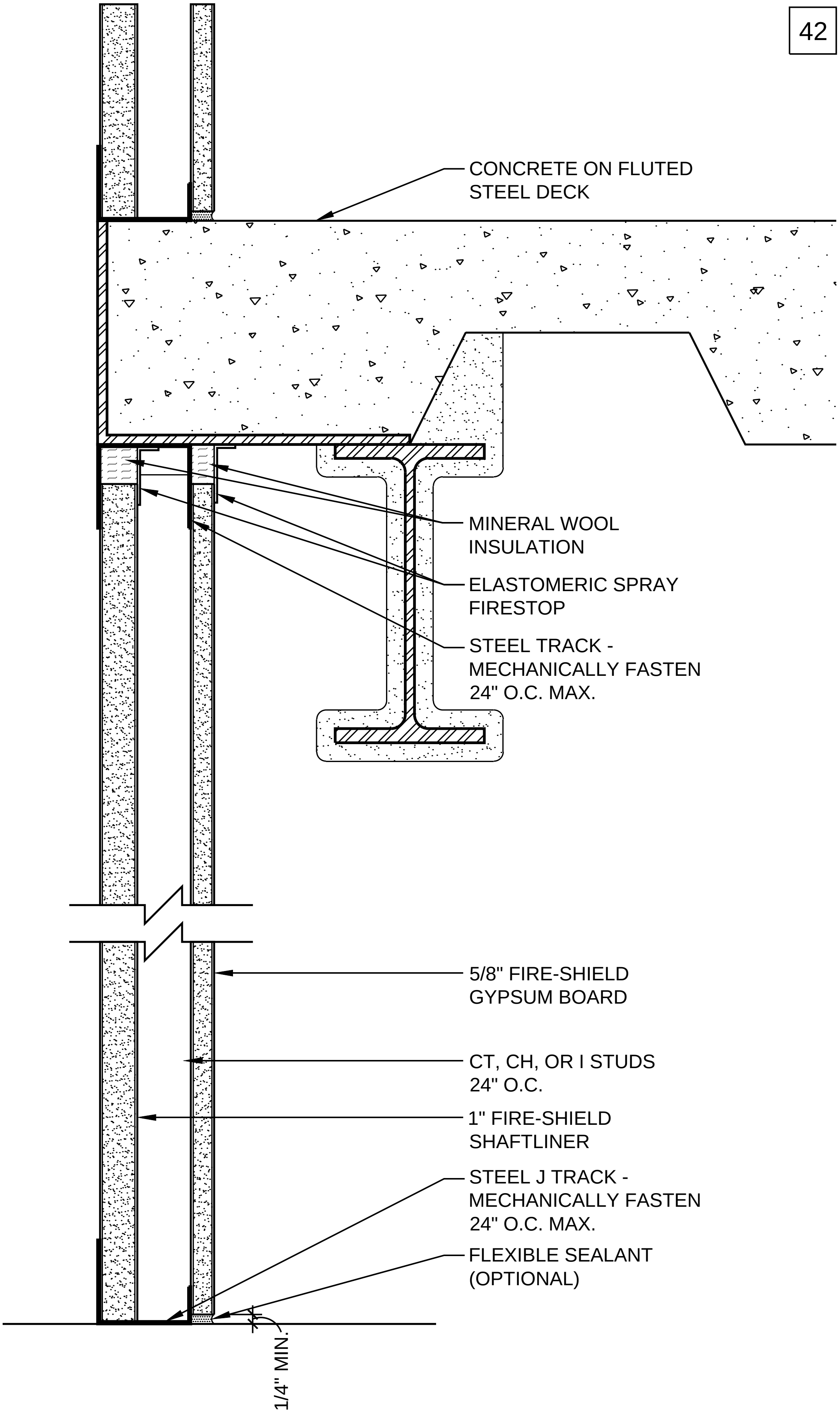
DATE: 11/05/13	1 HOUR SHAFTWALL PARTITION
SCALE: 3"=1'-0"	DETAIL: SW 101

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0194


CONCRETE ON FLUTED STEEL DECK
FIRESTOP SEALANT
SLOTTED TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

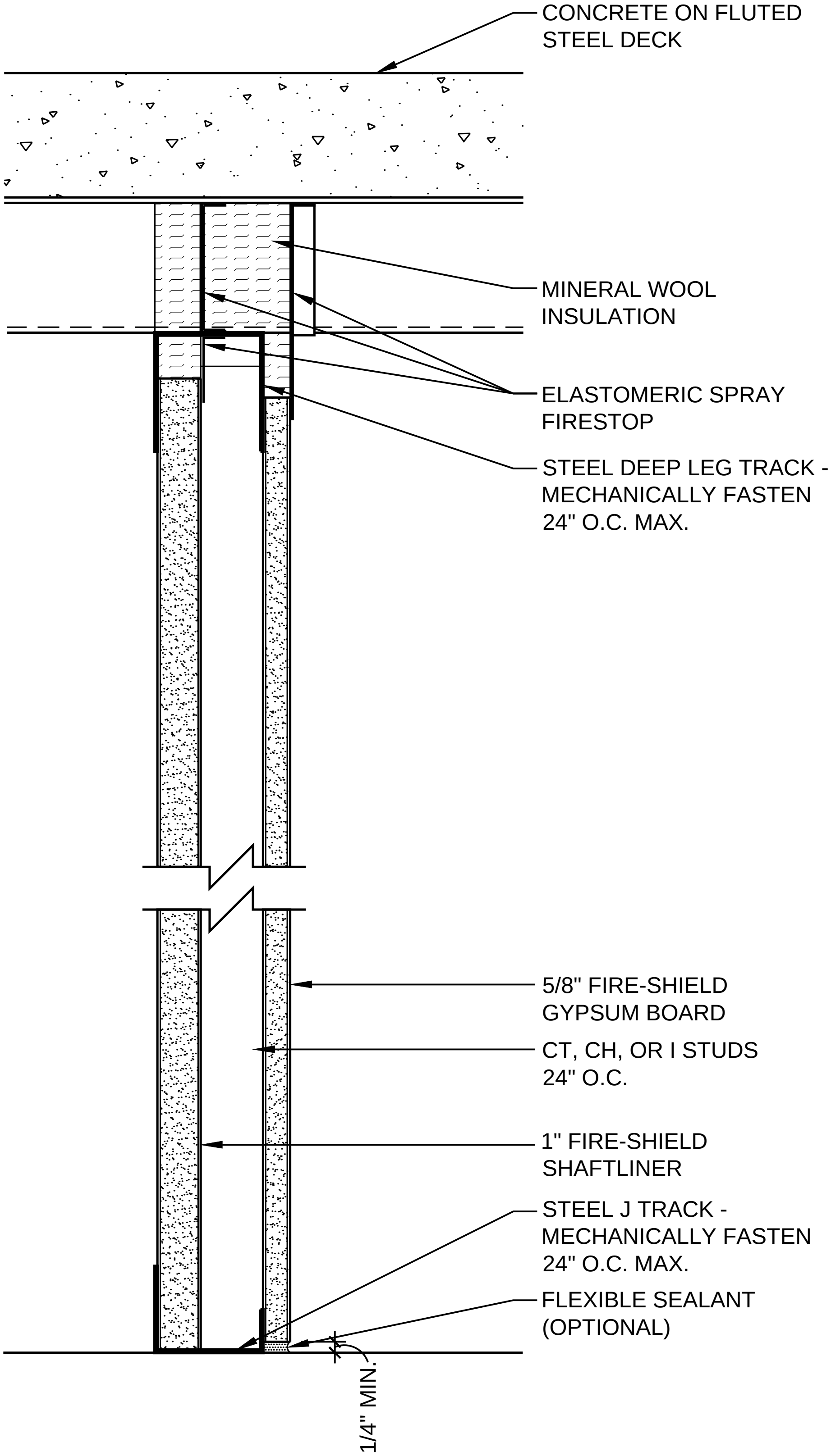
DATE: 11/05/13	1 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 102	


CONCRETE ON FLUTED STEEL DECK
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0572

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

DATE: 11/05/13	1 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 103	


CONCRETE ON FLUTED STEEL DECK
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
STEEL DEEP LEG TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0548

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

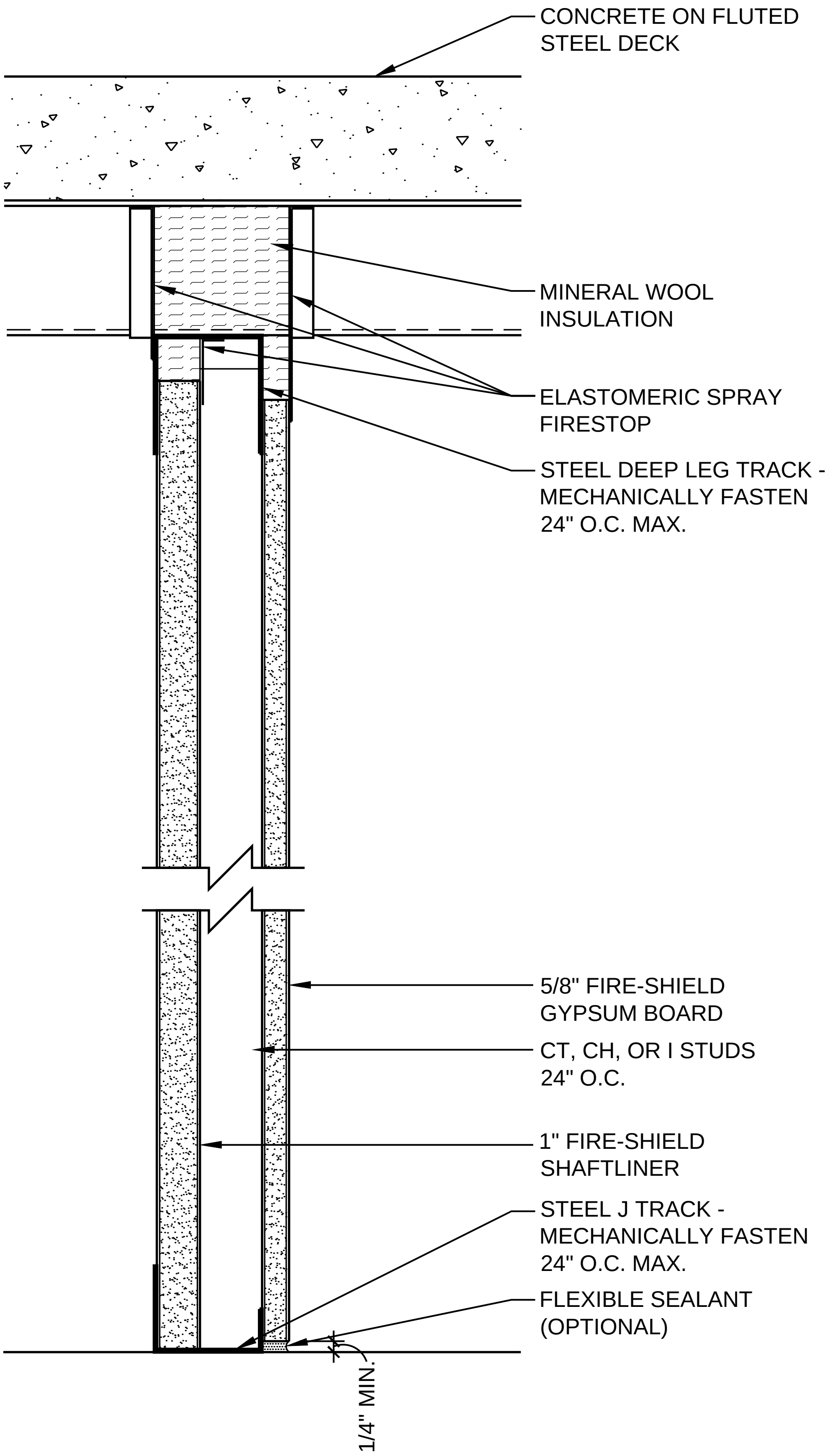
DATE: 11/05/13

1 HOUR SHAFTWALL TO STEEL DECK

SCALE: 3"=1'-0"

DETAIL: SW 104

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0569

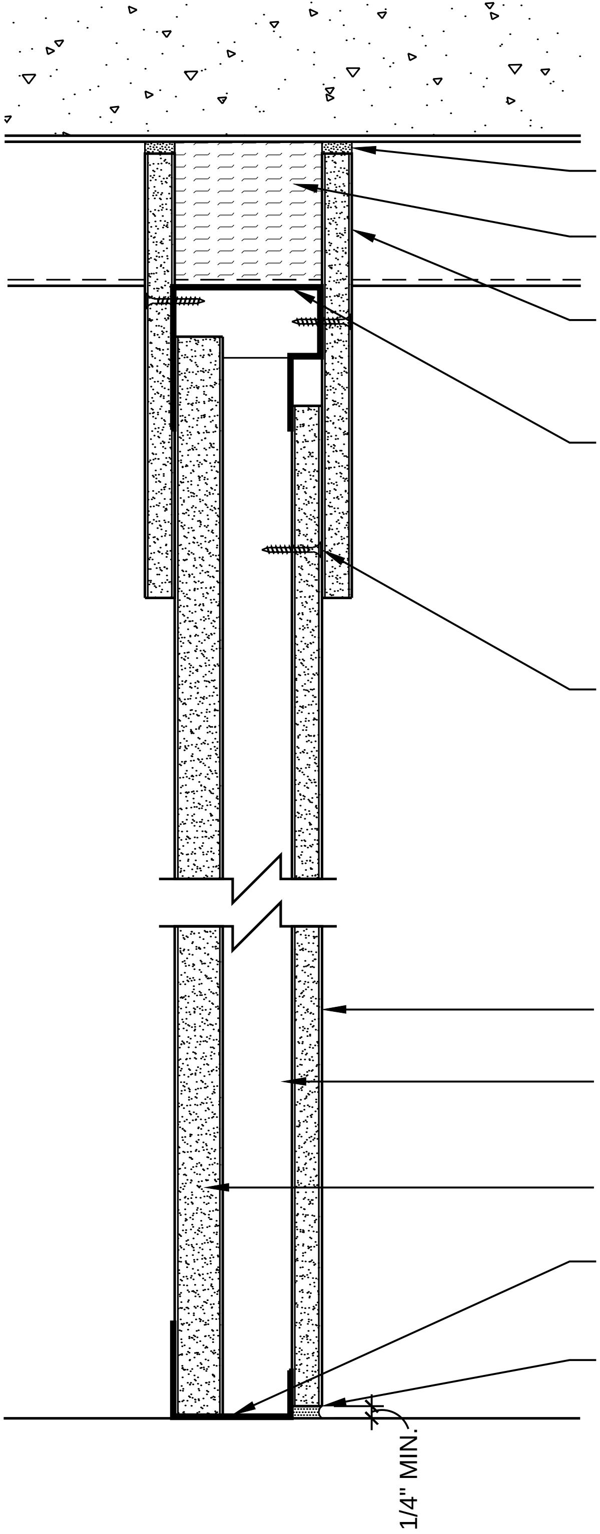

CONCRETE ON FLUTED STEEL DECK
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
STEEL DEEP LEG TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

DATE: 11/05/13	1 HOUR SHAFTWALL TO STEEL DECK
SCALE: 3"=1'-0"	DETAIL: SW 105

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0119

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419



CONCRETE ON FLUTED STEEL DECK

PROFORM QUICK-SET FS-90 COMPOUND

MINERAL WOOL INSULATION

CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION

FIRE TRAK SHADOWLINE MECHANICALLY FASTEN 24" O.C. MAX.

TOP ROW OF FASTENERS 3" FROM TOP OF GYPSUM BOARD

5/8" FIRE-SHIELD GYPSUM BOARD

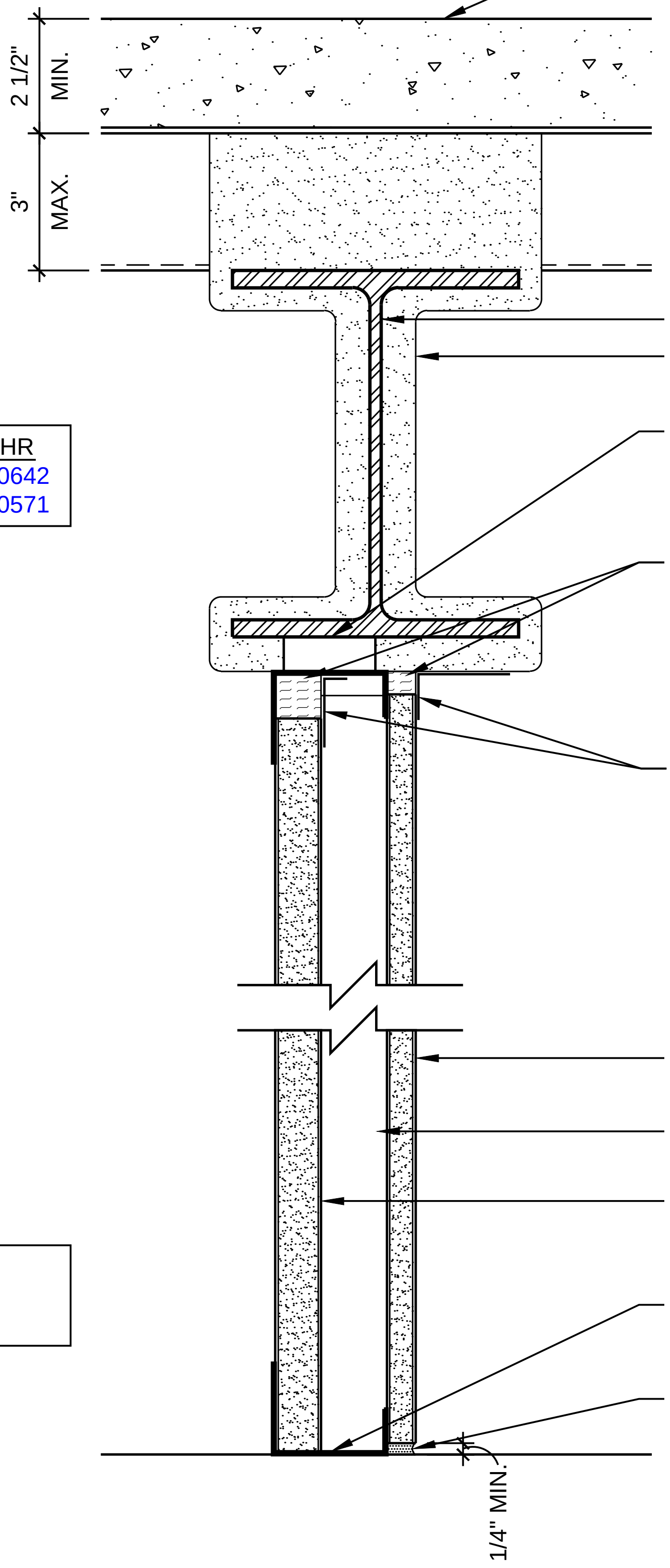
CT, CH, OR I STUDS 24" O.C.

1" FIRE-SHIELD SHAFTLINER

STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.

FLEXIBLE SEALANT (OPTIONAL)

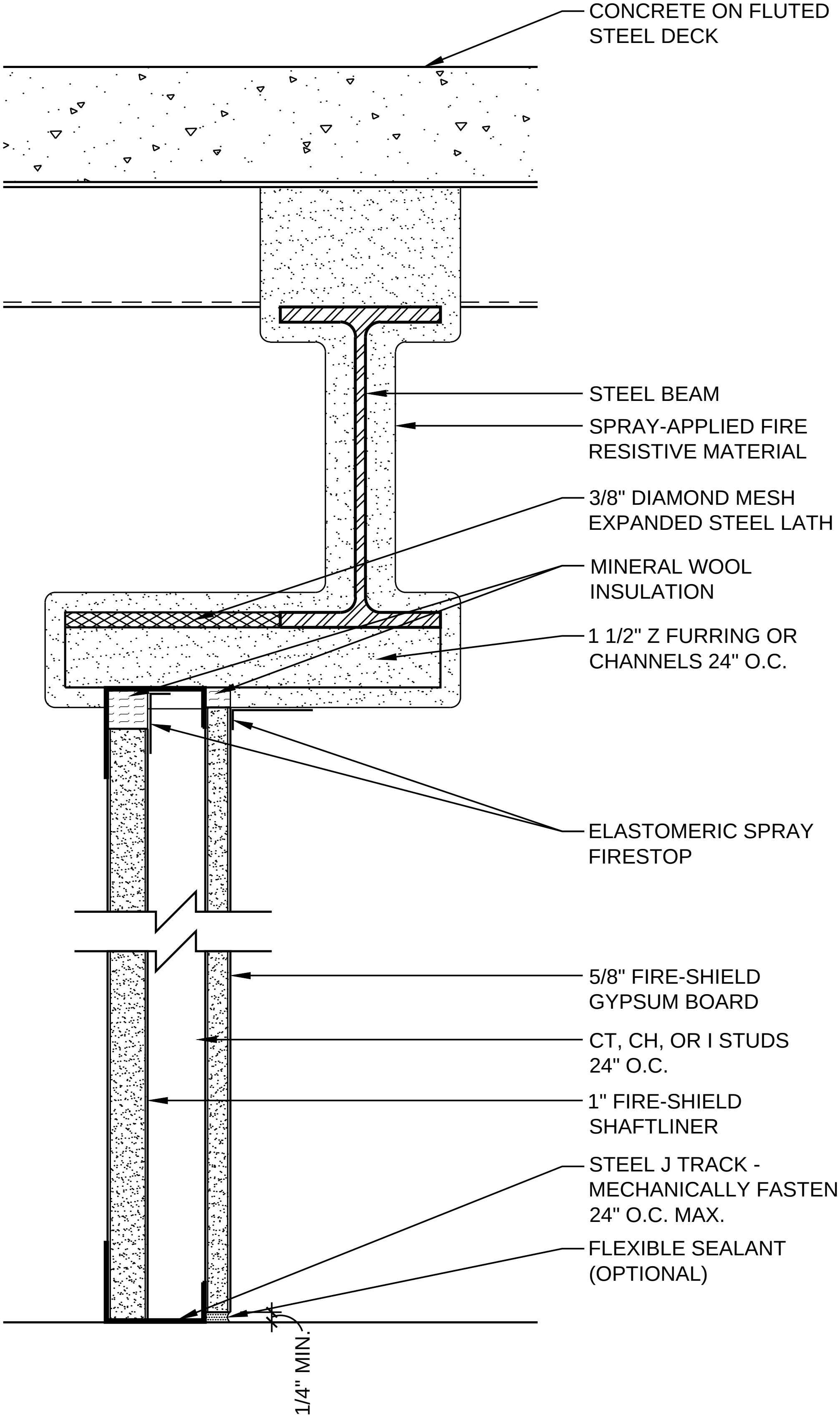
DATE: 11/05/13	1 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 106	


CONCRETE ON FLUTED STEEL DECK
2 1/2" MIN.
3" MAX.
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
20 GA. Z-CLIPS @ 24" O.C. MAX., FASTEN BEFORE APPLICATION OF SPRAY ON FIREPROOFING
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0642
UL DESIGN: HW-D-0571

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

DATE: 11/05/13	1 HOUR SHAFTWALL PARTITION TO STEEL BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 107	



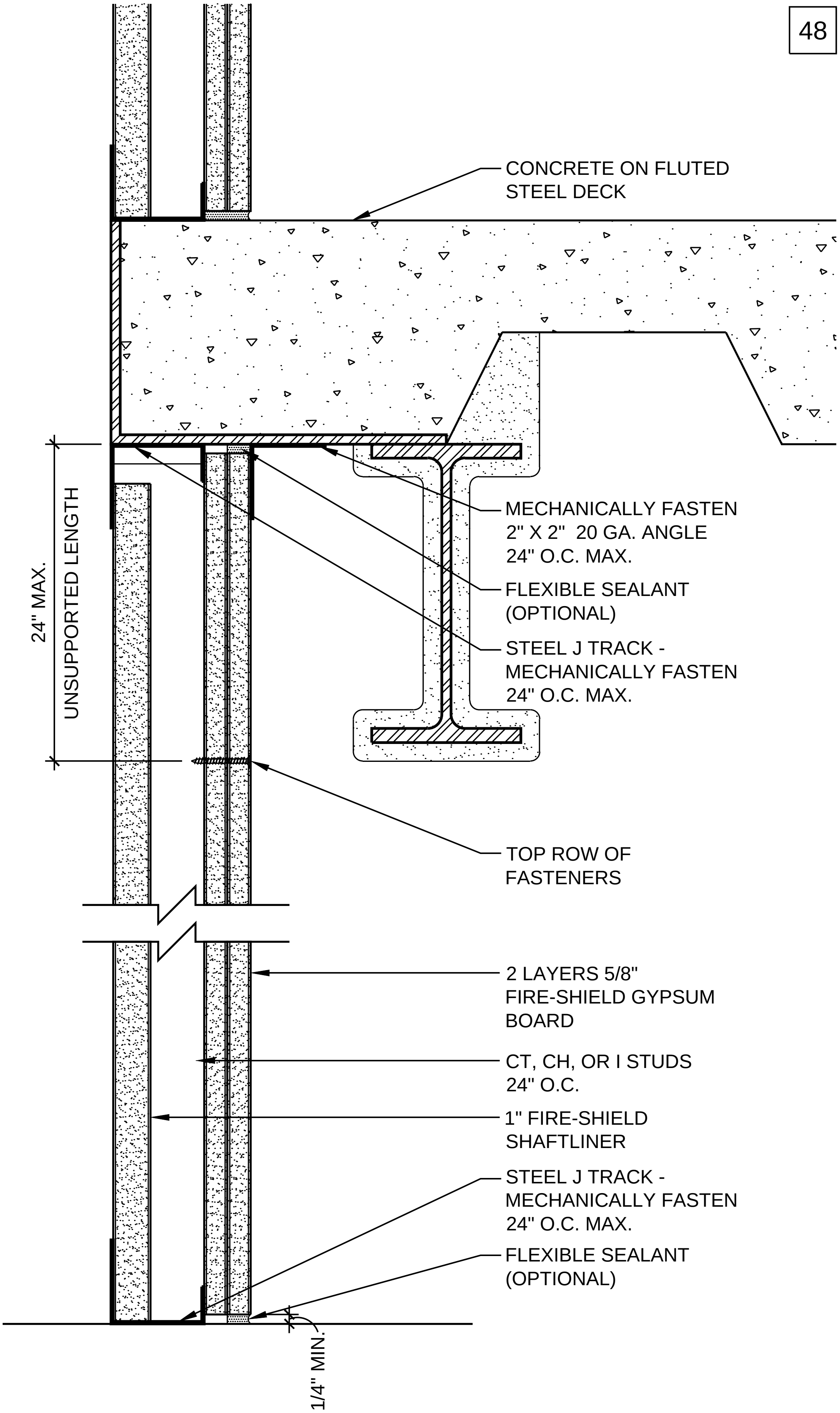
CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
3/8" DIAMOND MESH EXPANDED STEEL LATH
MINERAL WOOL INSULATION
1 1/2" Z FURRING OR CHANNELS 24" O.C.
ELASTOMERIC SPRAY FIRESTOP
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 1 HR
UL DESIGN: HW-D-0645
UL DESIGN: HW-D-0636

PARTITION - 1 HR
UL DESIGN: U499
UL DESIGN: W419

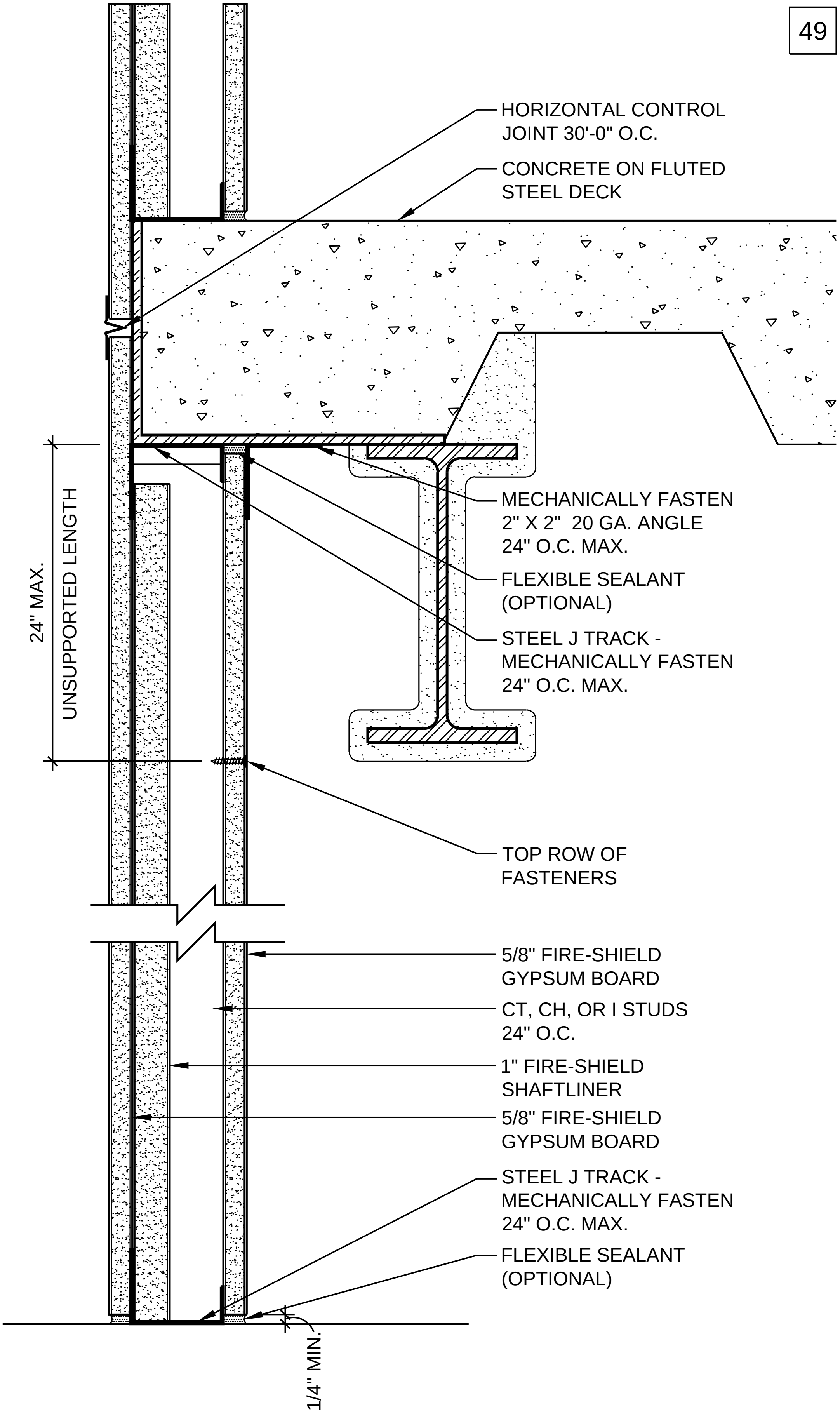
DATE: 11/05/13	1 HOUR SHAFTWALL PARTITION OFFSET FROM BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 108	

HEAD OF WALL - 2 HR
FMJ.I.1J6Q8.AC


CONCRETE ON FLUTED STEEL DECK
24" MAX.
UNSUPPORTED LENGTH
MECHANICALLY FASTEN 2" X 2" 20 GA. ANGLE 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
TOP ROW OF FASTENERS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

DATE: 11/05/13	2 HOUR SHAFTWALL PARTITION
SCALE: 3"=1'-0"	DETAIL: SW 201


HORIZONTAL CONTROL JOINT 30'-0" O.C.
CONCRETE ON FLUTED STEEL DECK
MECHANICALLY FASTEN 2" X 2" 20 GA. ANGLE 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
24" MAX.
UNSUPPORTED LENGTH
TOP ROW OF FASTENERS
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

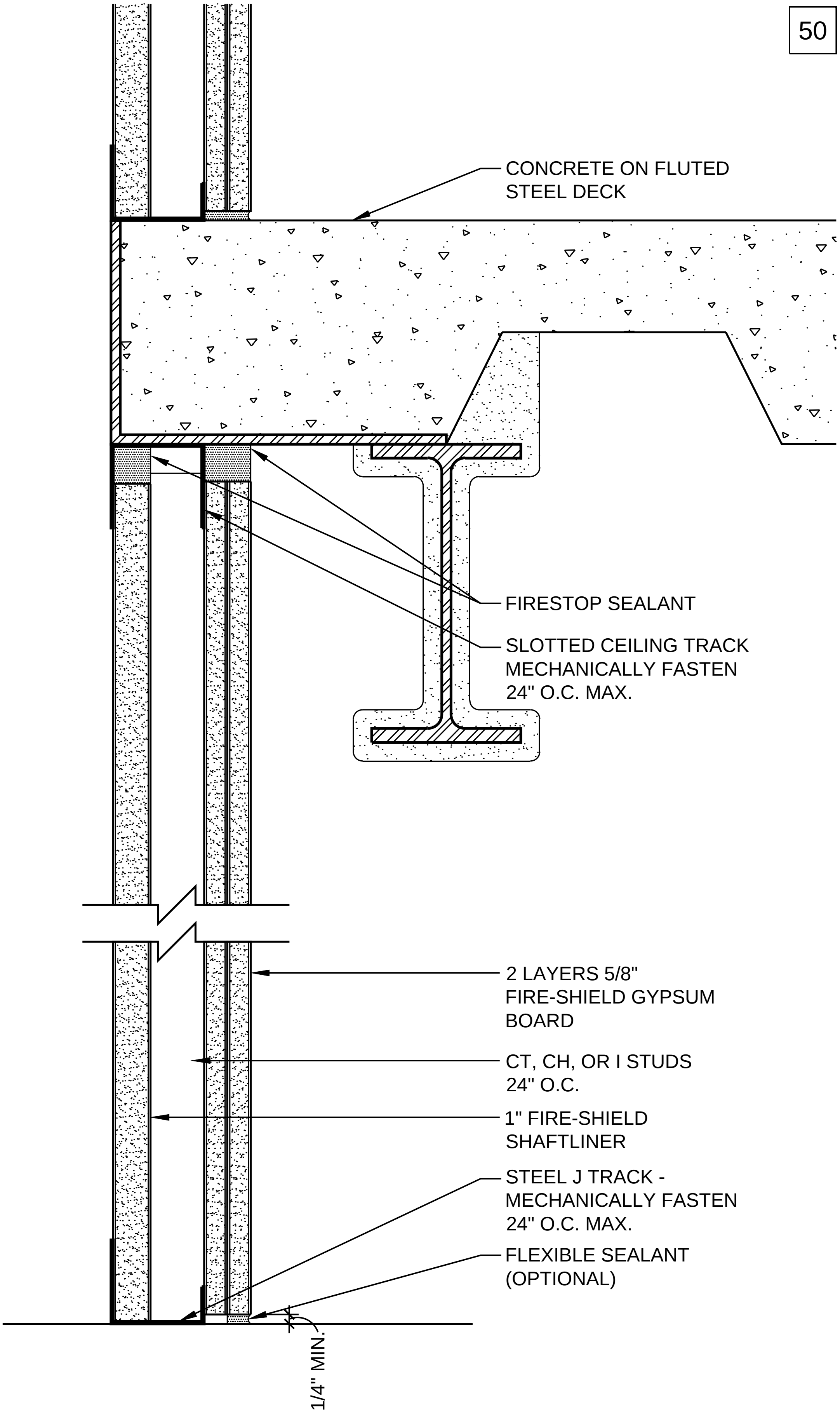
HEAD OF WALL - 2 HR
FMJ.I.1J6Q8.AC

PARTITION - 2 HR
UL DESIGN: U498
UL DESIGN: W419

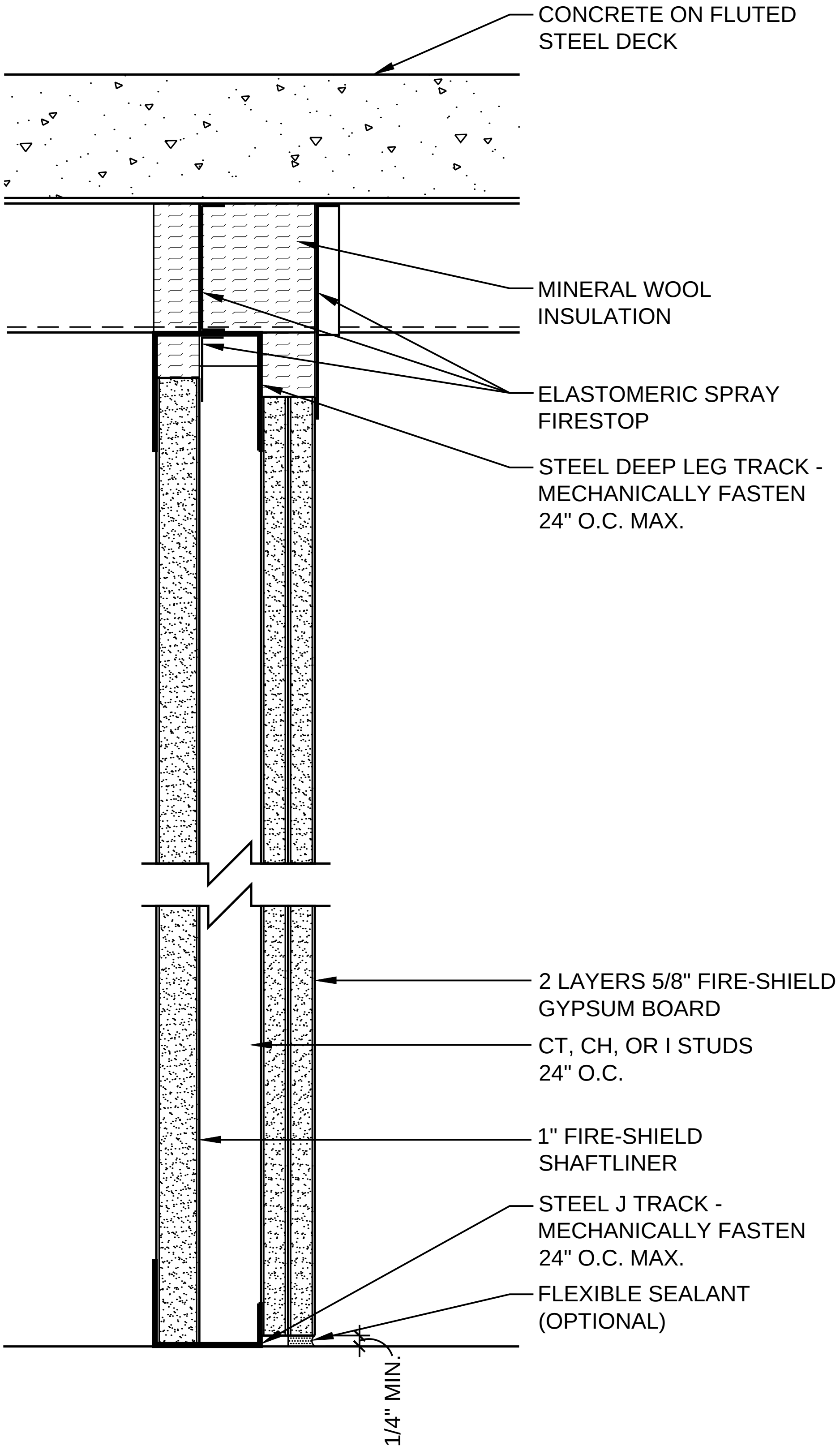
DATE: 11/05/13
2 HOUR SHAFTWALL PARTITION AT STAIR
SCALE: 3"=1'-0"
DETAIL: SW 202

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0194
UL DESIGN: HW-D-0342

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419


CONCRETE ON FLUTED STEEL DECK
FIRESTOP SEALANT
SLOTTED CEILING TRACK MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

DATE: 11/05/13	2 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 203	

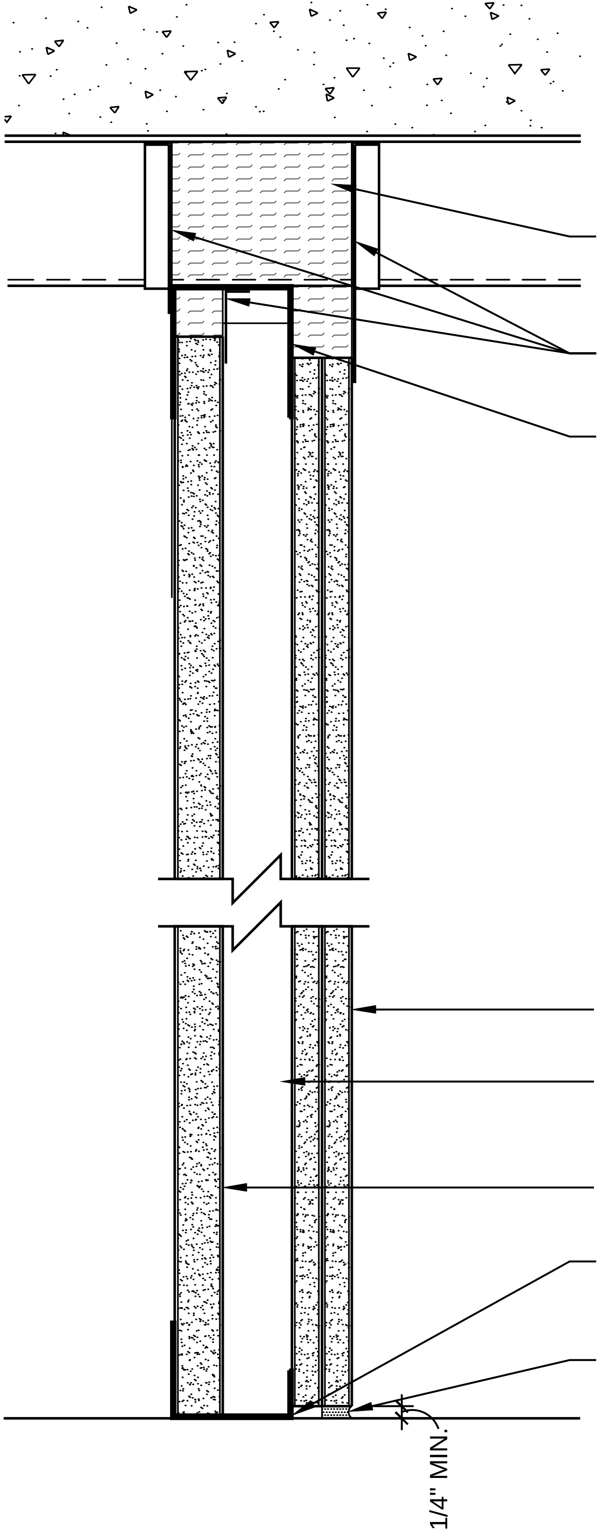

CONCRETE ON FLUTED STEEL DECK
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
STEEL DEEP LEG TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0548

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

DATE: 11/05/13	2 HOUR SHAFTWALL TO STEEL DECK
SCALE: 3"=1'-0"	DETAIL: SW 204

National Gypsum

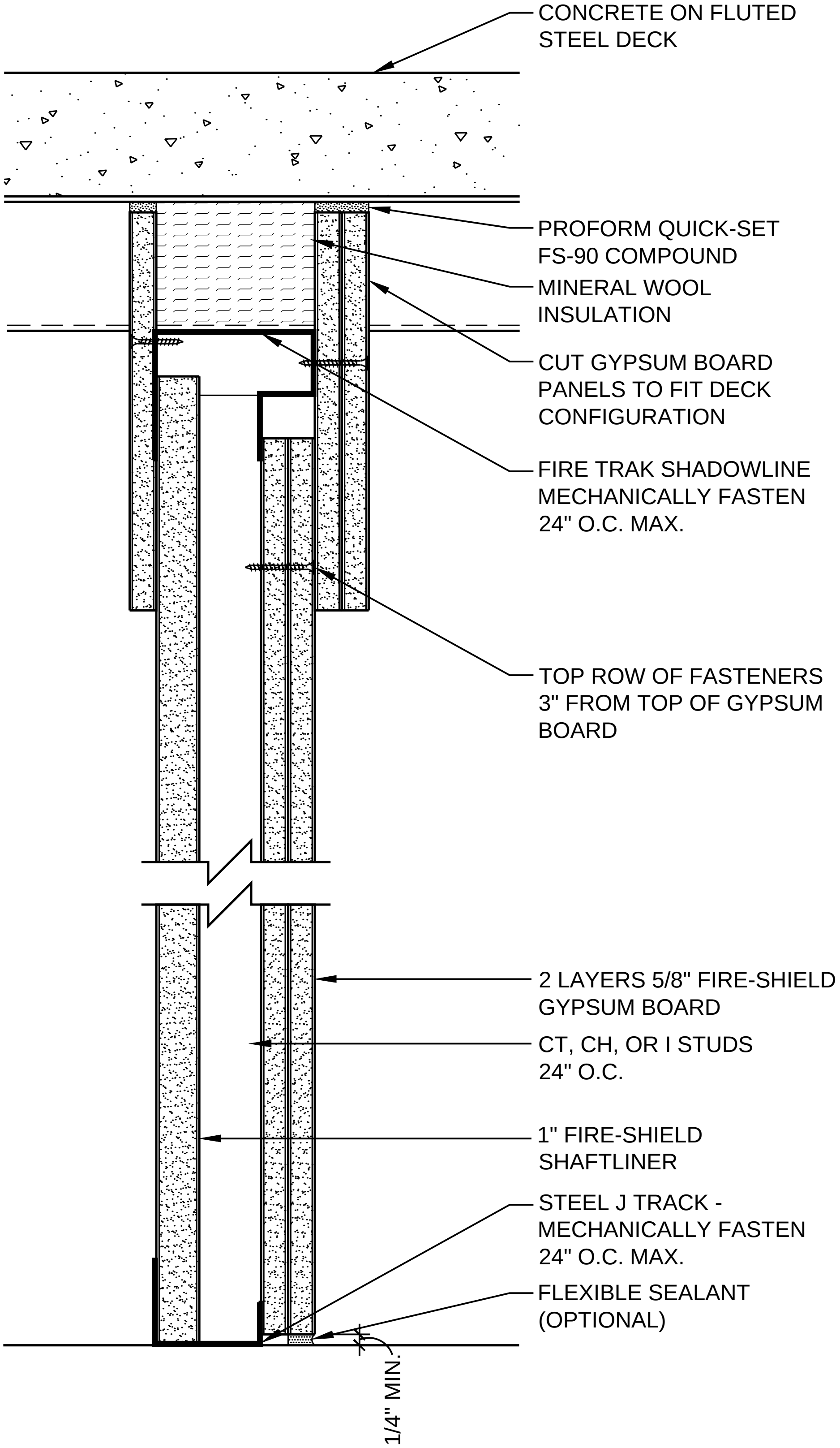

CONCRETE ON FLUTED STEEL DECK
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
STEEL DEEP LEG TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0569

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

DATE: 11/05/13	2 HOUR SHAFTWALL TO STEEL DECK
SCALE: 3"=1'-0"	DETAIL: SW 205

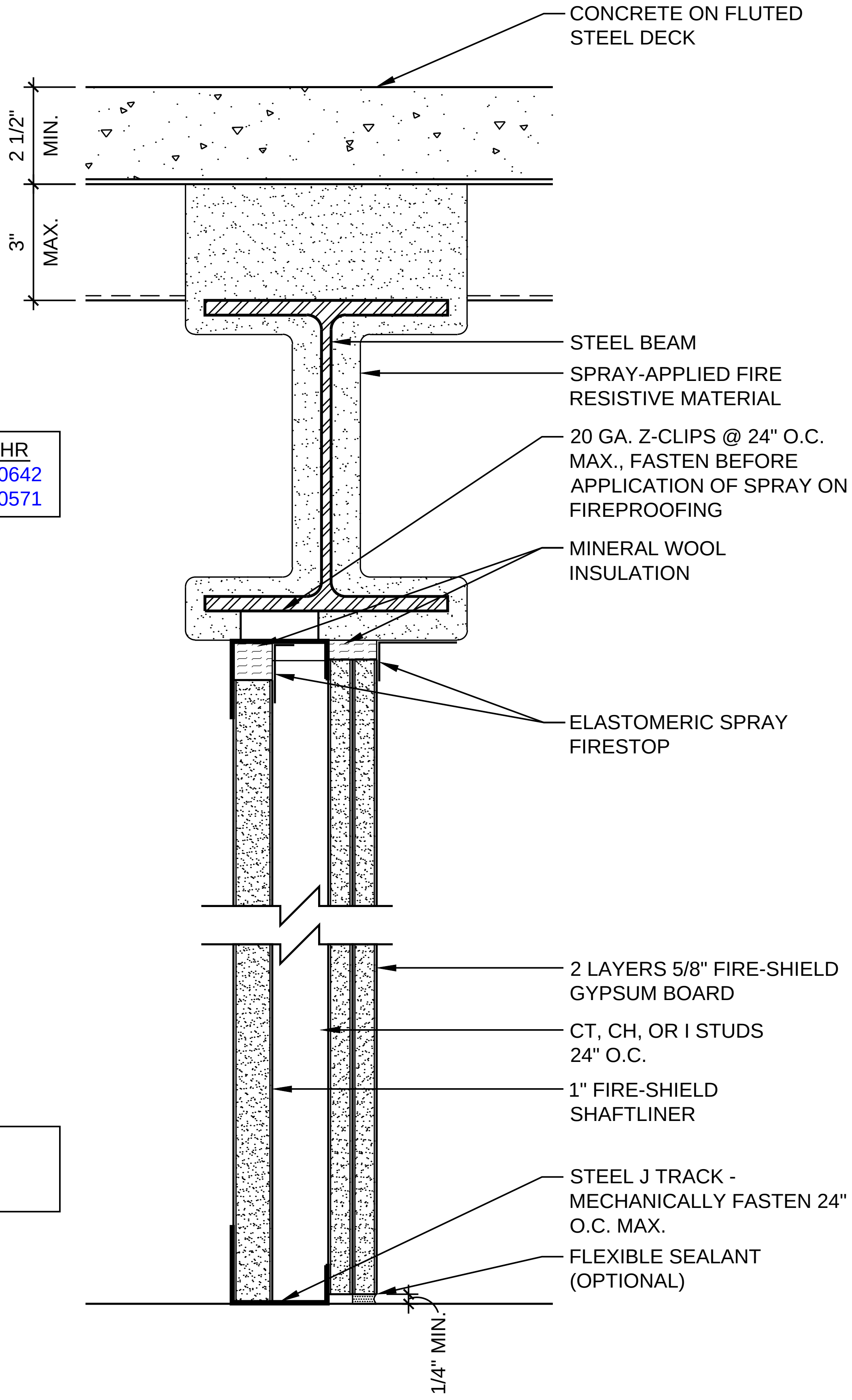
National Gypsum


CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
MINERAL WOOL INSULATION
CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION
FIRE TRAK SHADOWLINE MECHANICALLY FASTEN 24" O.C. MAX.
TOP ROW OF FASTENERS 3" FROM TOP OF GYPSUM BOARD
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0119

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

DATE: 11/05/13	2 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 206	

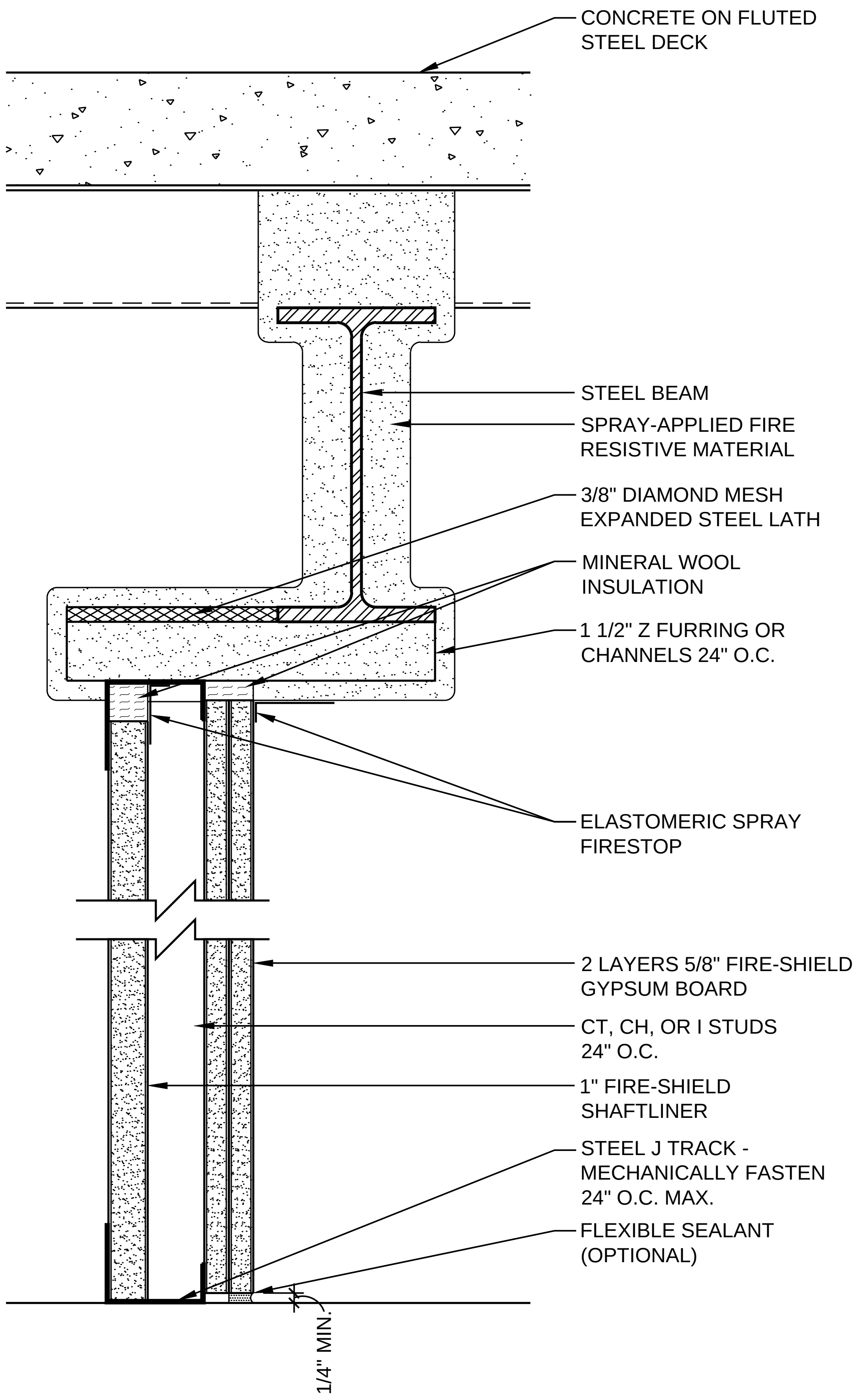

CONCRETE ON FLUTED STEEL DECK
2 1/2" MIN.
3" MAX.
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
20 GA. Z-CLIPS @ 24" O.C. MAX., FASTEN BEFORE APPLICATION OF SPRAY ON FIREPROOFING
MINERAL WOOL INSULATION
ELASTOMERIC SPRAY FIRESTOP
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0642
UL DESIGN: HW-D-0571

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

DATE: 11/05/13	2 HOUR SHAFTWALL PARTITION TO STEEL BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 207	

HEAD OF WALL - 2 HR
UL DESIGN: HW-D-0645
UL DESIGN: HW-D-0636

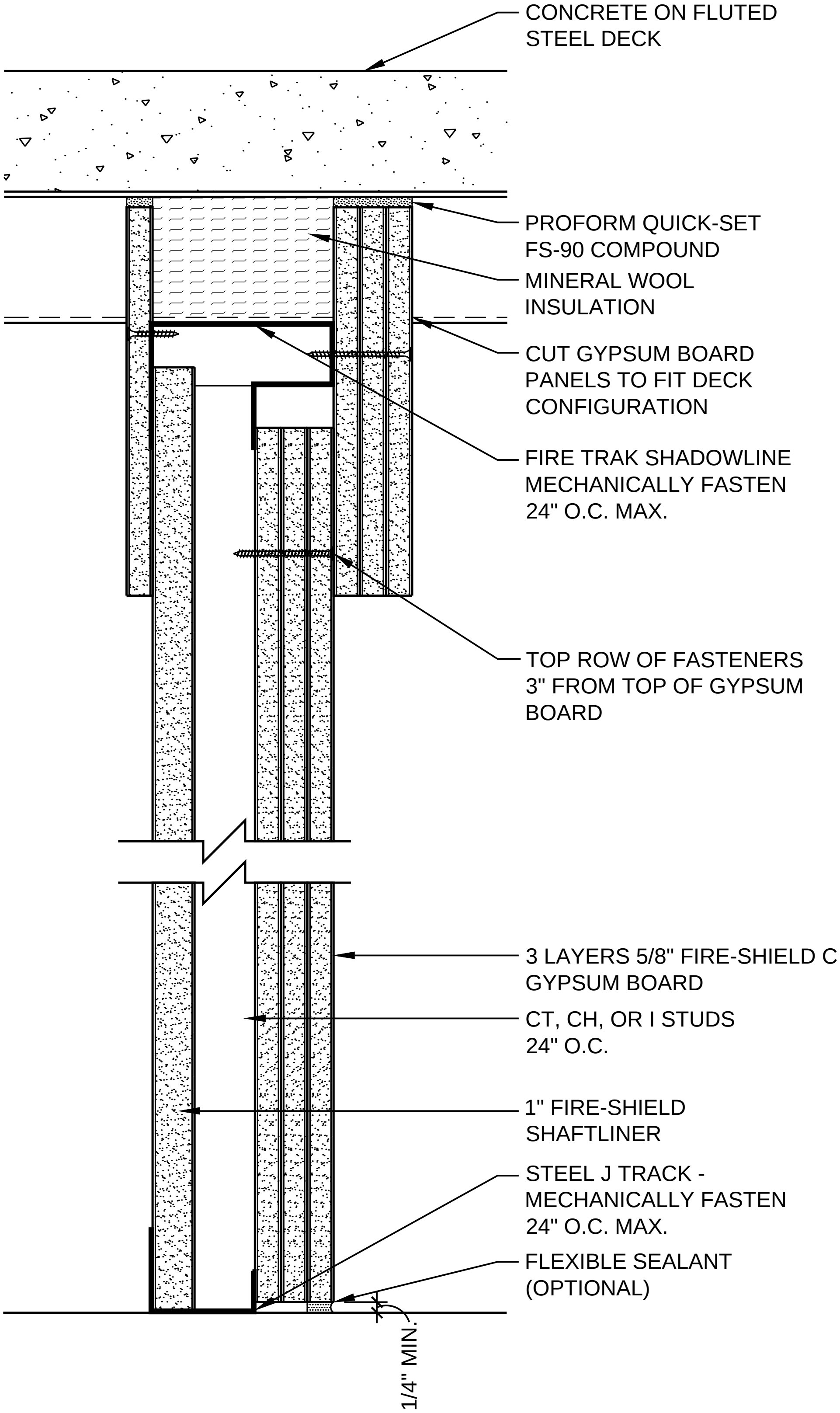

CONCRETE ON FLUTED STEEL DECK
STEEL BEAM
SPRAY-APPLIED FIRE RESISTIVE MATERIAL
3/8" DIAMOND MESH EXPANDED STEEL LATH
MINERAL WOOL INSULATION
1 1/2" Z FURRING OR CHANNELS 24" O.C.
ELASTOMERIC SPRAY FIRESTOP
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

PARTITION - 2 HR
UL DESIGN: U497
UL DESIGN: W419

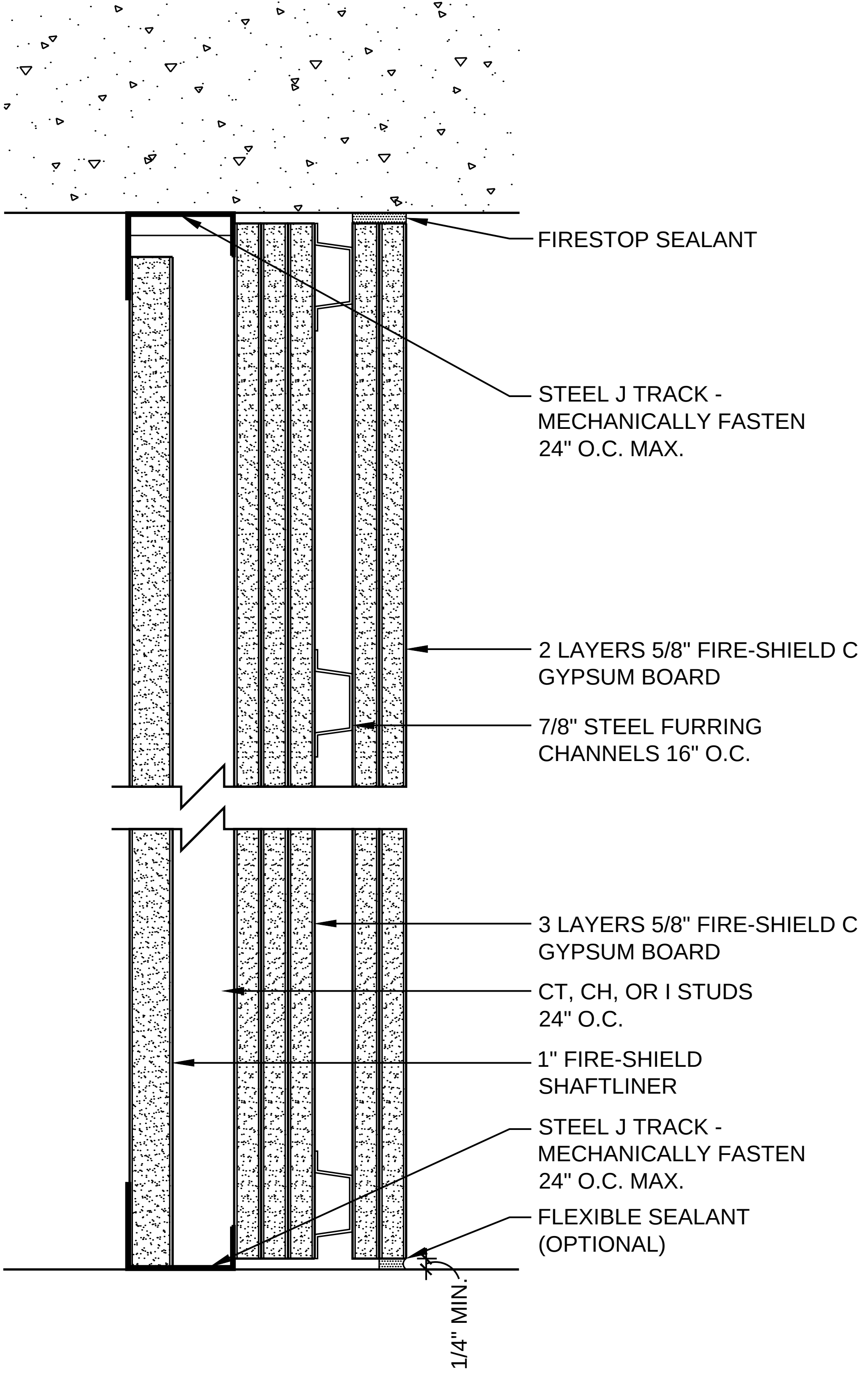
DATE: 11/05/13	2 HOUR SHAFTWALL PARTITION OFFSET FROM BEAM	National Gypsum.
SCALE: 3"=1'-0"	DETAIL: SW 208	

HEAD OF WALL - 3 HR
UL DESIGN: HW-D-0119

PARTITION - 3 HR
UL DESIGN: W414
UL DESIGN: W419

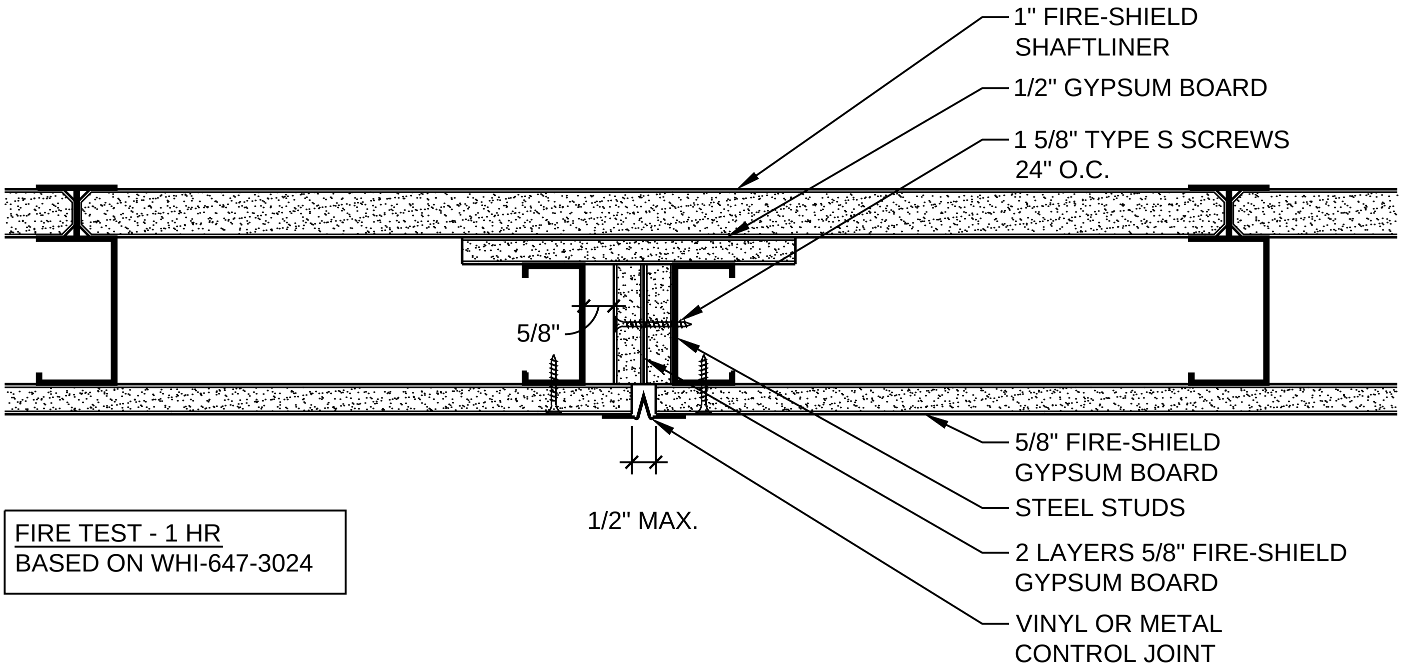

CONCRETE ON FLUTED STEEL DECK
PROFORM QUICK-SET FS-90 COMPOUND
MINERAL WOOL INSULATION
CUT GYPSUM BOARD PANELS TO FIT DECK CONFIGURATION
FIRE TRAK SHADOWLINE MECHANICALLY FASTEN 24" O.C. MAX.
TOP ROW OF FASTENERS 3" FROM TOP OF GYPSUM BOARD
3 LAYERS 5/8" FIRE-SHIELD C GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
FLEXIBLE SEALANT (OPTIONAL)
1/4" MIN.

DATE: 11/05/13	3 HOUR SHAFTWALL WITH DEFLECTION TRACK	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 301	

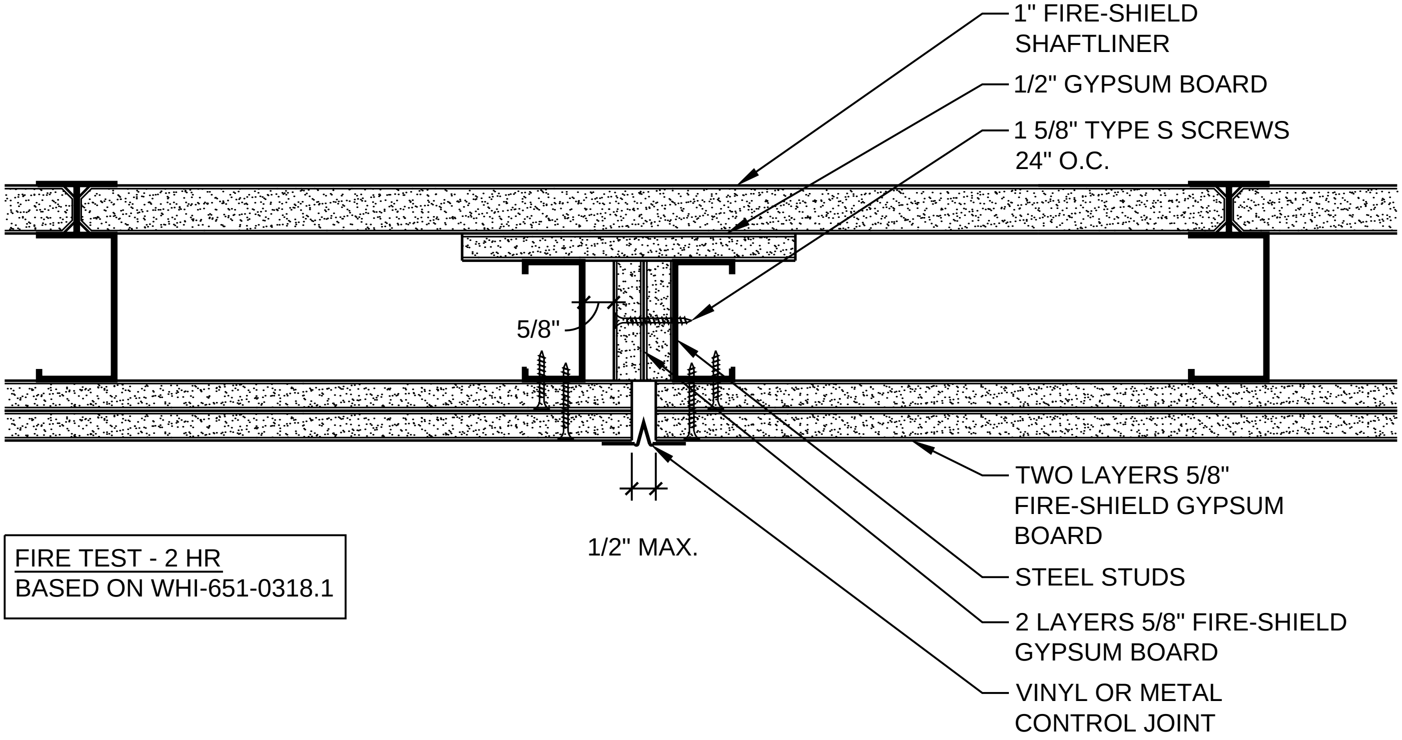

CONCRETE OR FLUTED
STEEL DECK
FIRESTOP SEALANT
STEEL J TRACK -
MECHANICALLY FASTEN
24" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD C
GYPSUM BOARD
7/8" STEEL FURRING
CHANNELS 16" O.C.
3 LAYERS 5/8" FIRE-SHIELD C
GYPSUM BOARD
CT, CH, OR I STUDS
24" O.C.
1" FIRE-SHIELD
SHAFTLINER
STEEL J TRACK -
MECHANICALLY FASTEN
24" O.C. MAX.
FLEXIBLE SEALANT
(OPTIONAL)
1/4" MIN.

PARTITION - 4 HR
UL DESIGN: V451
UL DESIGN: W419

DATE: 11/05/13	4 HOUR SHAFTWALL PARTITION	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 401	

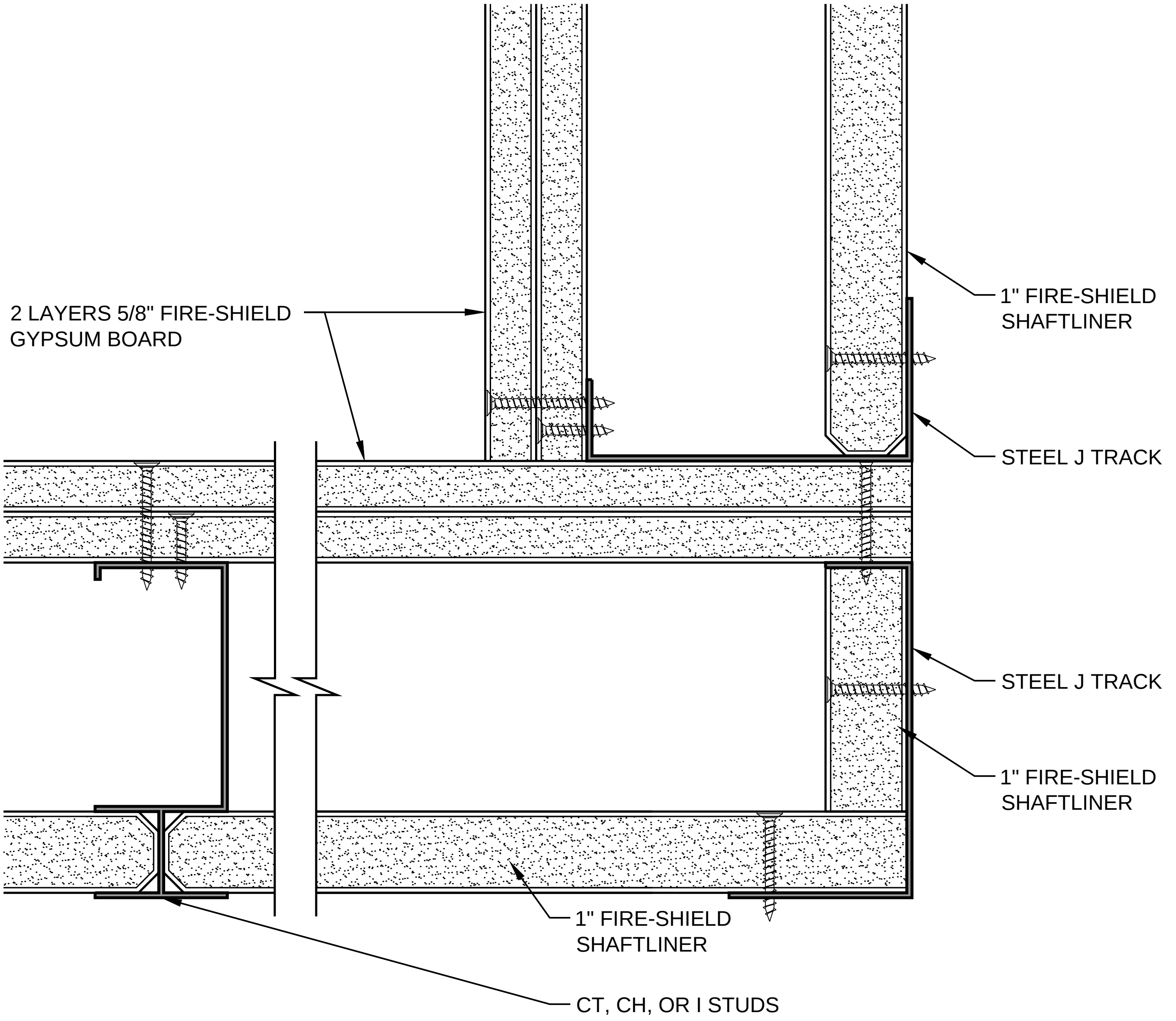

1" FIRE-SHIELD SHAFTLINER
1/2" GYPSUM BOARD
1 5/8" TYPE S SCREWS 24" O.C.
5/8"
1/2" MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
STEEL STUDS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
VINYL OR METAL CONTROL JOINT

FIRE TEST - 1 HR
BASED ON WHI-647-3024

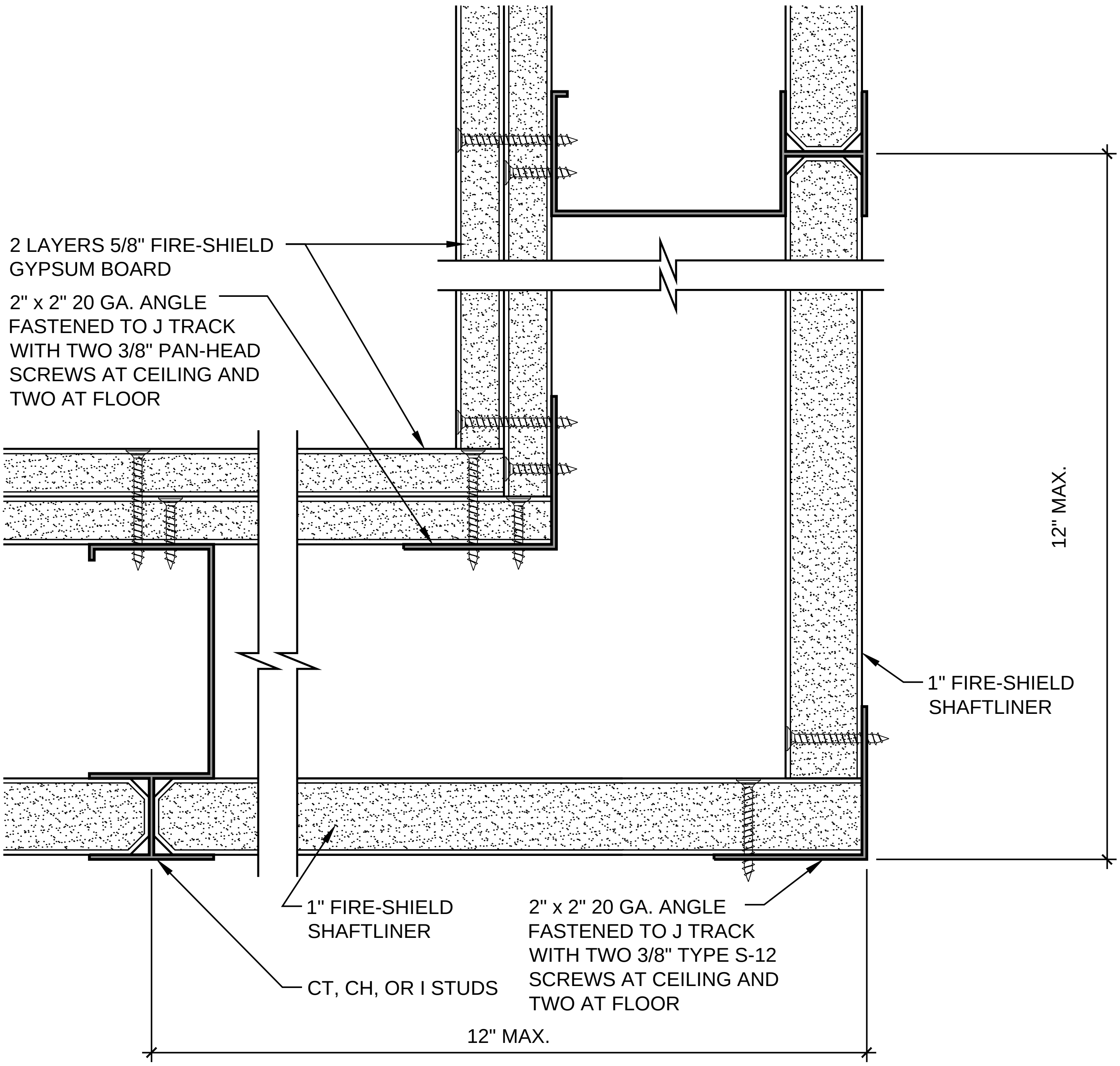

1" FIRE-SHIELD SHAFTLINER
1/2" GYPSUM BOARD
1 5/8" TYPE S SCREWS 24" O.C.
5/8"
1/2" MAX.
TWO LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL STUDS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
VINYL OR METAL CONTROL JOINT

FIRE TEST - 2 HR
BASED ON WHI-651-0318.1

DATE: 11/05/13
CONTROL JOINTS FOR SHAFTWALL SYSTEMS
SCALE: 3"=1'-0"
DETAIL: SW 501
National Gypsum


2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK
STEEL J TRACK
1" FIRE-SHIELD SHAFTLINER
1" FIRE-SHIELD SHAFTLINER
CT, CH, OR I STUDS

DATE: 11/05/13	2 HOUR SHAFTWALL CORNER DETAIL	National Gypsum
SCALE: 6"=1'-0"	DETAIL: SW 601	


2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
2" x 2" 20 GA. ANGLE FASTENED TO J TRACK WITH TWO 3/8" PAN-HEAD SCREWS AT CEILING AND TWO AT FLOOR
12" MAX.
1" FIRE-SHIELD SHAFTLINER
1" FIRE-SHIELD SHAFTLINER
2" x 2" 20 GA. ANGLE FASTENED TO J TRACK WITH TWO 3/8" TYPE S-12 SCREWS AT CEILING AND TWO AT FLOOR
CT, CH, OR I STUDS
12" MAX.

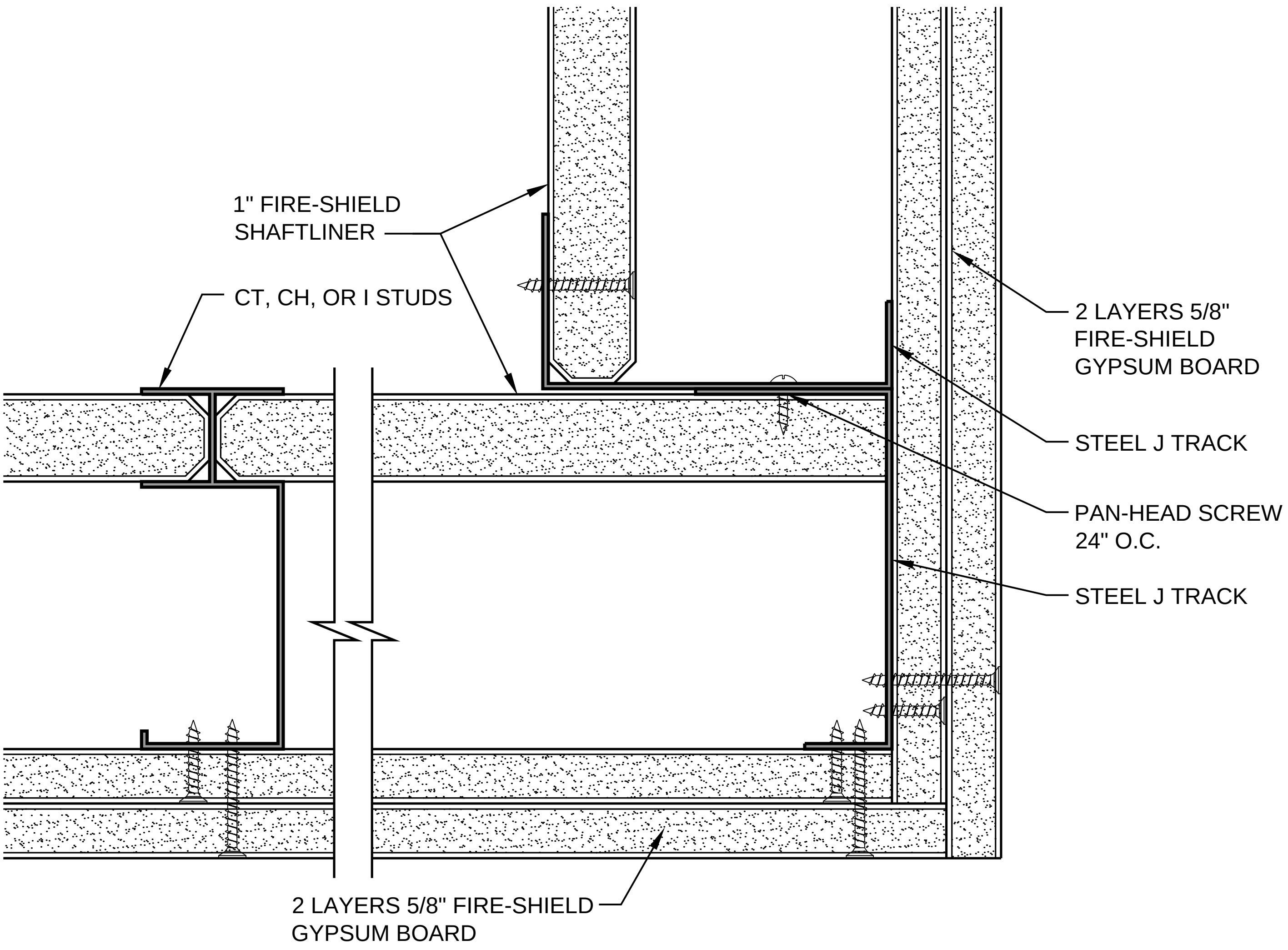
DATE: 11/05/13

2 HOUR SHAFTWALL CORNER DETAIL

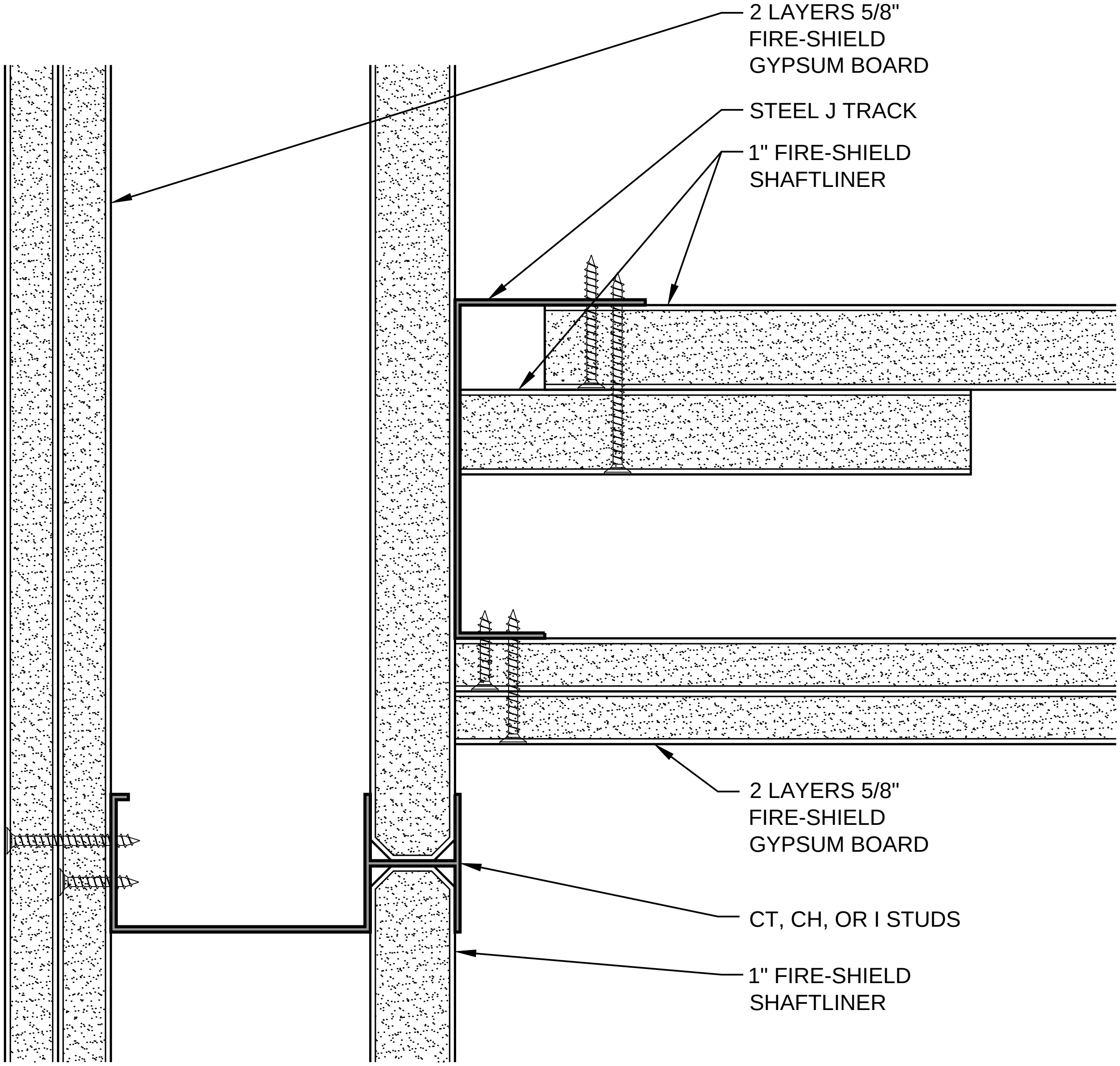
SCALE: 6"=1'-0"

DETAIL: SW 602

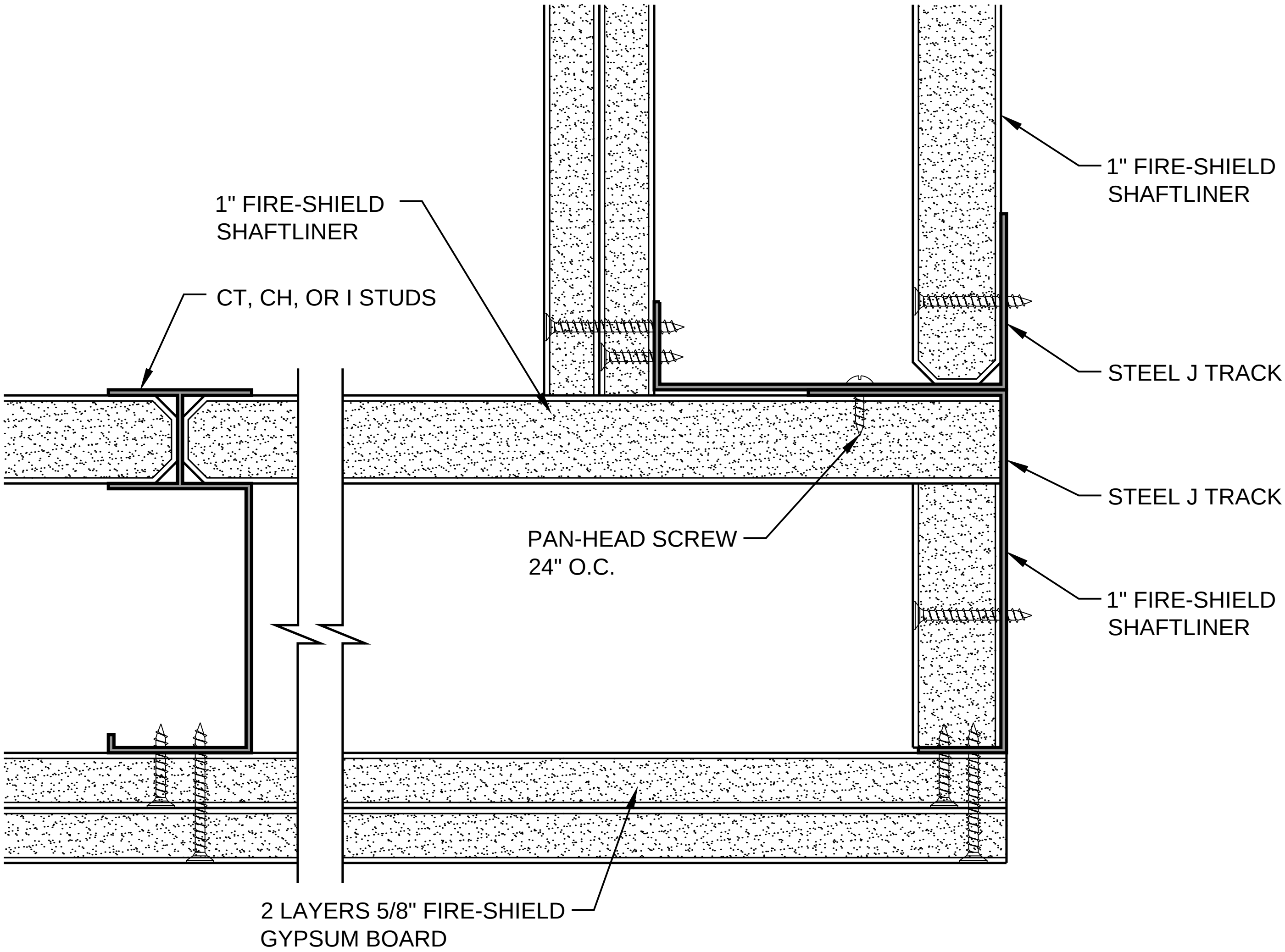
National Gypsum.


1" FIRE-SHIELD SHAFTLINER
CT, CH, OR I STUDS
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
STEEL J TRACK
PAN-HEAD SCREW 24" O.C.
STEEL J TRACK
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

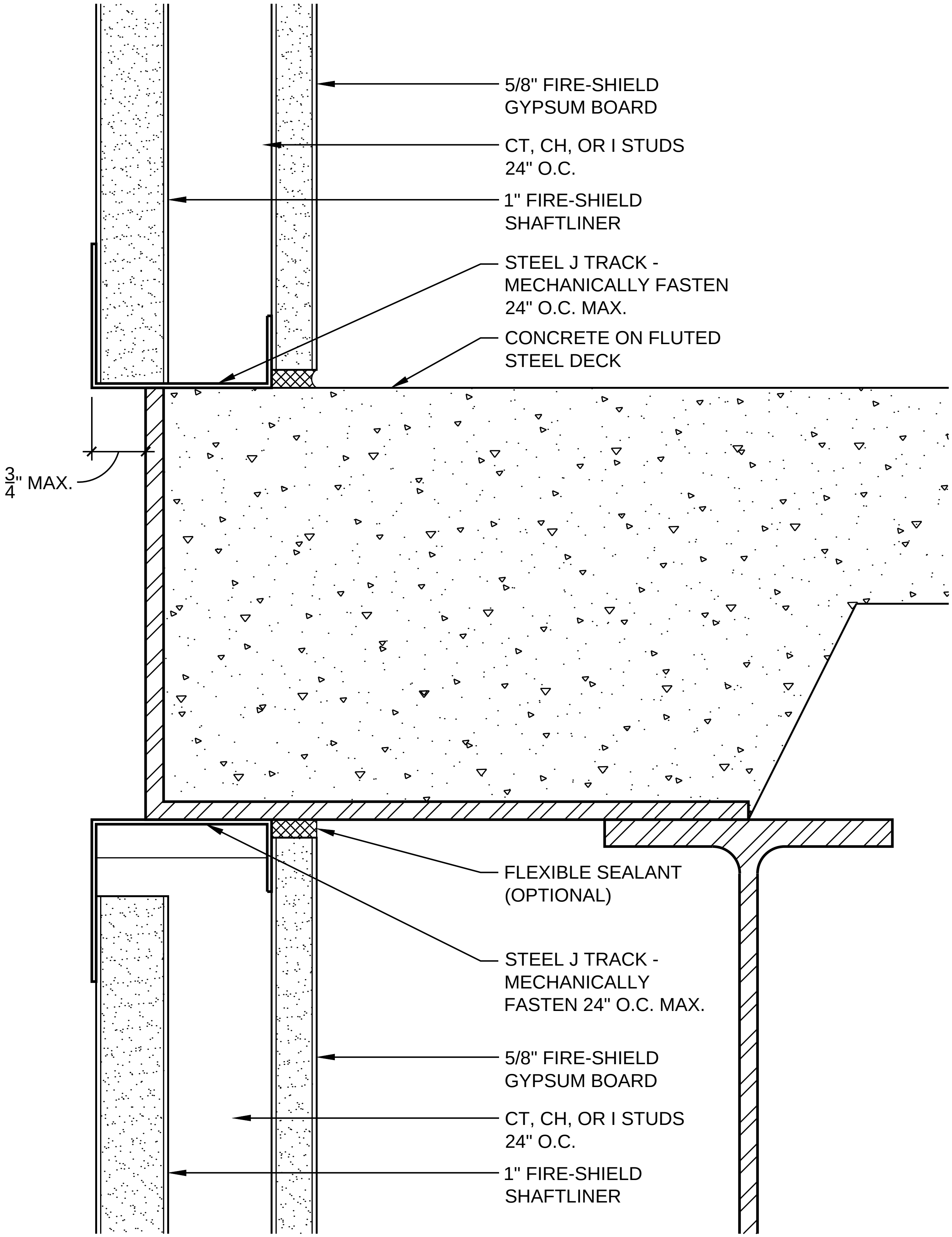
DATE: 11/05/13	2 HOUR SHAFTWALL CORNER DETAIL	National Gypsum®
SCALE: 6"=1'-0"	DETAIL: SW 603	


2 LAYERS 5/8"
FIRE-SHIELD
GYPSUM BOARD
STEEL J TRACK
1" FIRE-SHIELD
SHAFTLINER
2 LAYERS 5/8"
FIRE-SHIELD
GYPSUM BOARD
CT, CH, OR I STUDS
1" FIRE-SHIELD
SHAFTLINER

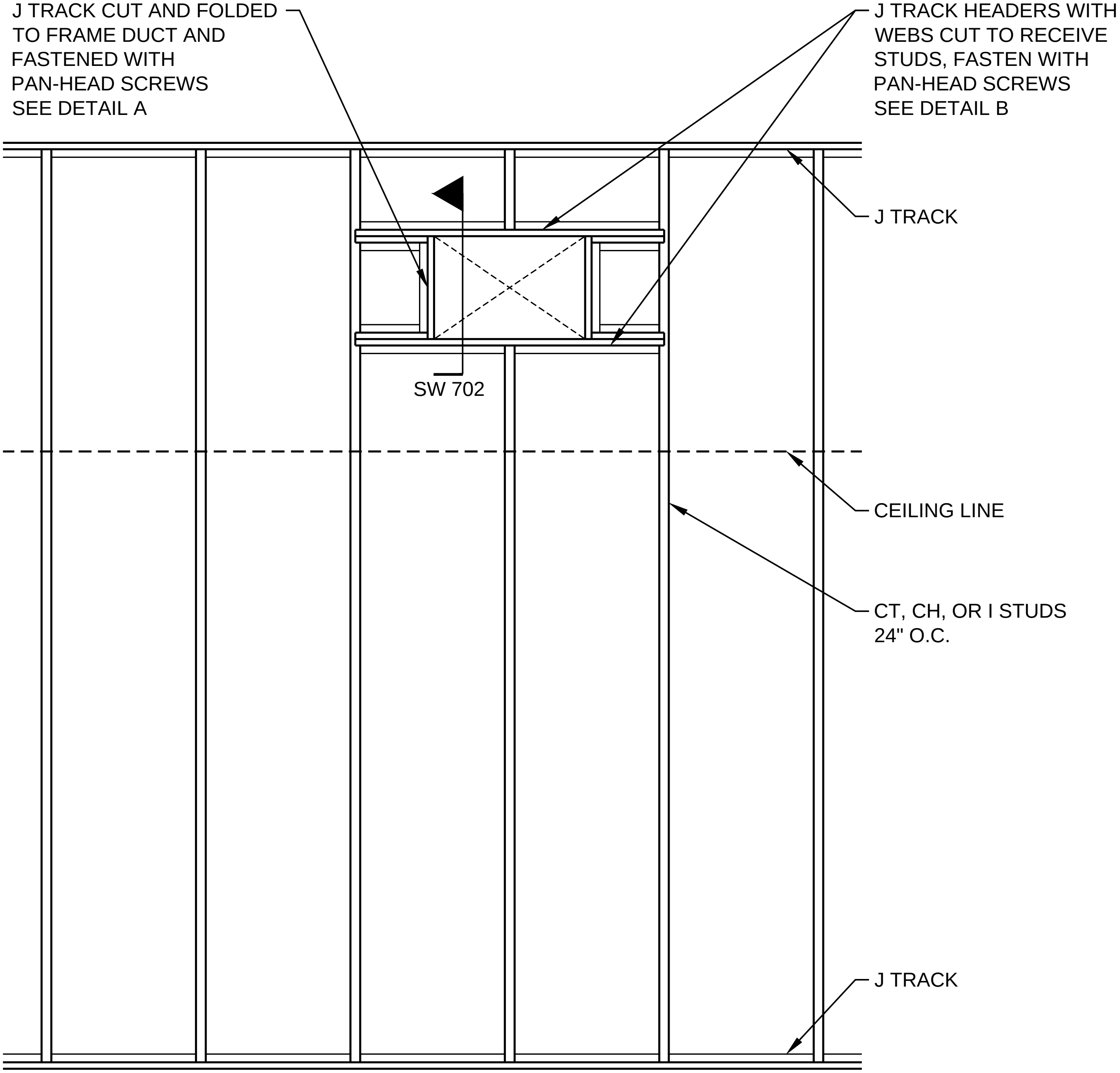
DATE: 11/05/13	2 HOUR SHAFTWALL CORNER DETAIL	National Gypsum
SCALE: 6"=1'-0"	DETAIL: SW 604	

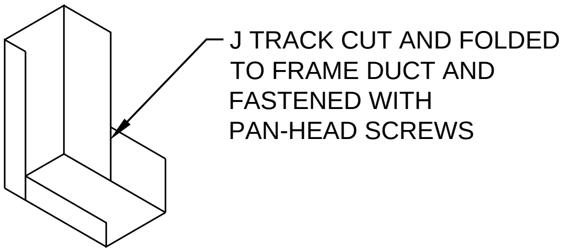

1" FIRE-SHIELD SHAFTLINER
CT, CH, OR I STUDS
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK
STEEL J TRACK
PAN-HEAD SCREW 24" O.C.
1" FIRE-SHIELD SHAFTLINER
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

DATE: 11/05/13	2 HOUR SHAFTWALL CORNER DETAIL	National Gypsum
SCALE: 6"=1'-0"	DETAIL: SW 605	

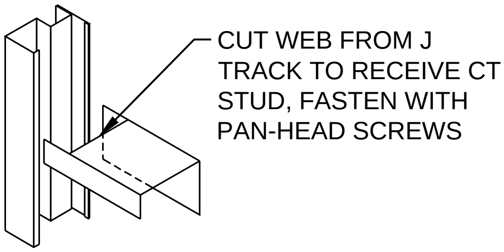

5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
CONCRETE ON FLUTED STEEL DECK
$\frac{3}{4}$" MAX.
FLEXIBLE SEALANT (OPTIONAL)
STEEL J TRACK - MECHANICALLY FASTEN 24" O.C. MAX.
5/8" FIRE-SHIELD GYPSUM BOARD
CT, CH, OR I STUDS 24" O.C.
1" FIRE-SHIELD SHAFTLINER

DATE: 11/05/13	SHAFTWALL OVERHANG AT SLAB EDGE	National Gypsum
SCALE: 6"=1'-0"	DETAIL: SW 606	


J TRACK CUT AND FOLDED TO FRAME DUCT AND FASTENED WITH PAN-HEAD SCREWS SEE DETAIL A
J TRACK HEADERS WITH WEBS CUT TO RECEIVE STUDS, FASTEN WITH PAN-HEAD SCREWS SEE DETAIL B
J TRACK
SW 702
CEILING LINE
CT, CH, OR I STUDS 24" O.C.
J TRACK

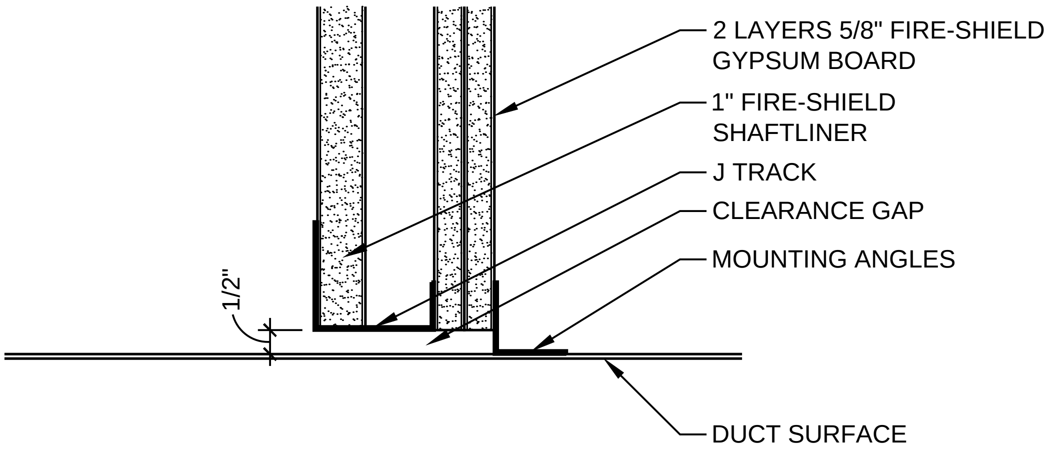

J TRACK CUT AND FOLDED TO FRAME DUCT AND FASTENED WITH PAN-HEAD SCREWS

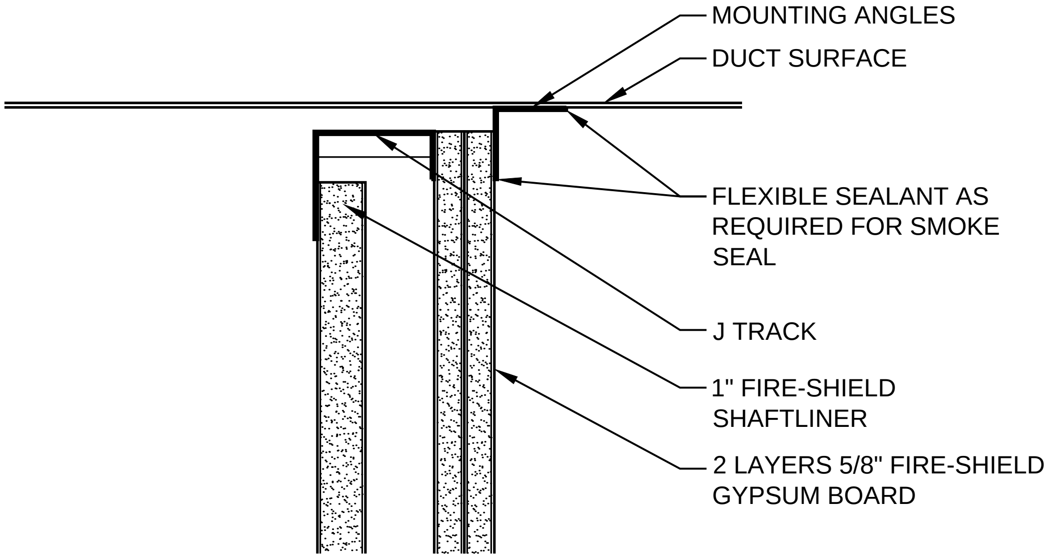
DETAIL A


CUT WEB FROM J TRACK TO RECEIVE CT STUD, FASTEN WITH PAN-HEAD SCREWS

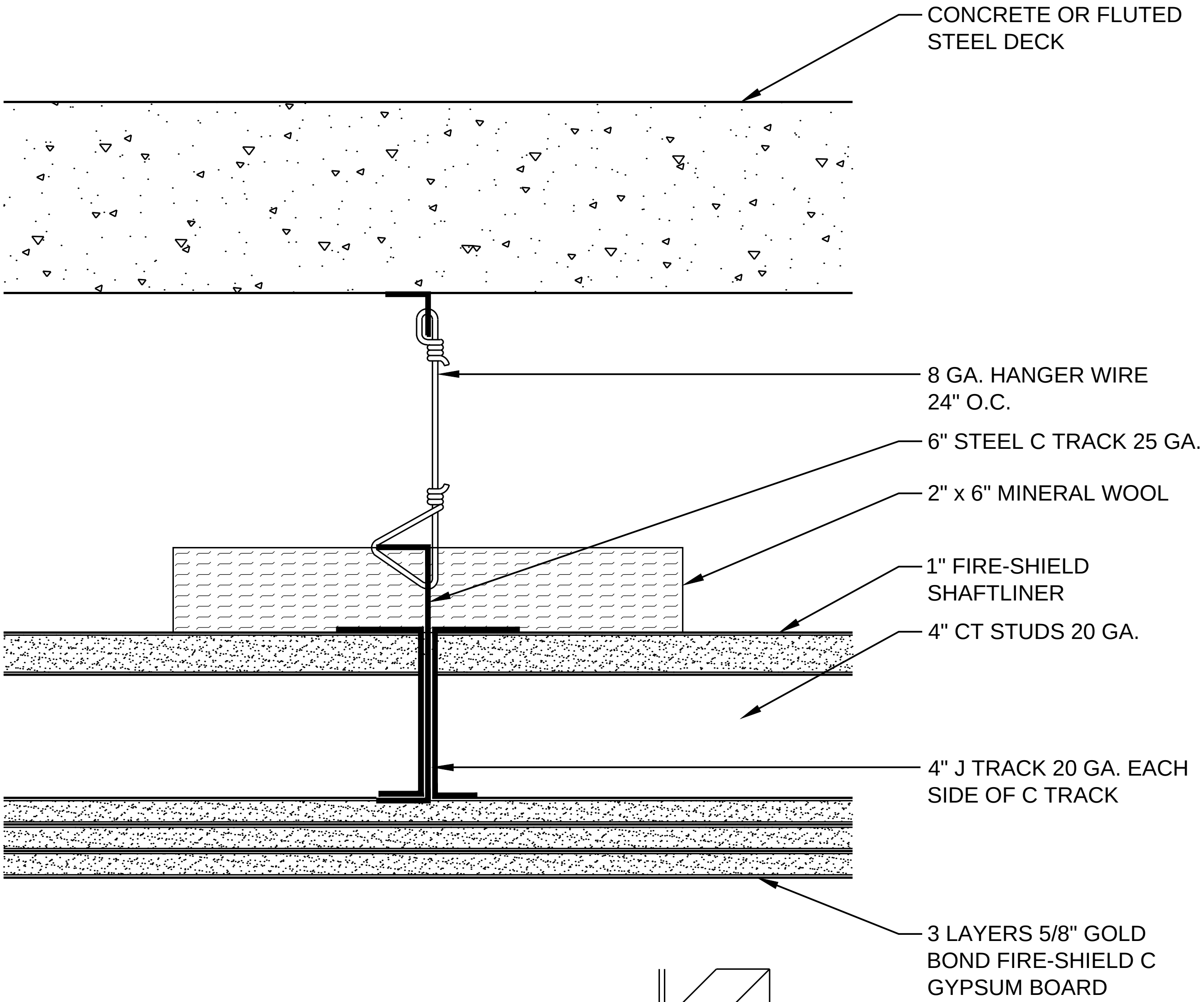
DETAIL B

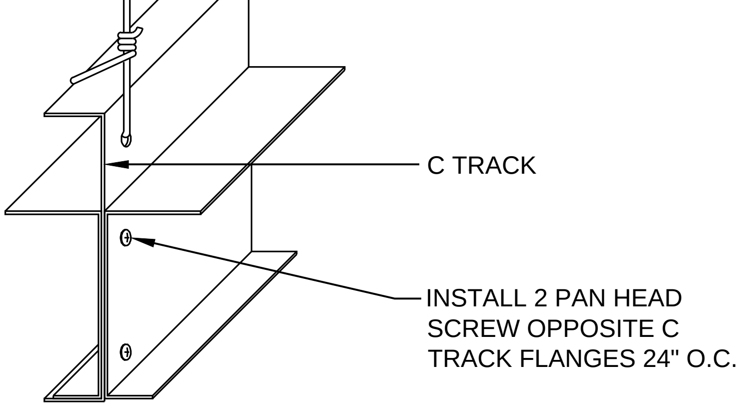
DATE: 11/05/13	SHAFTWALL FRAMING AT DUCT PENETRATION	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: SW 701	


2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
J TRACK
CLEARANCE GAP
MOUNTING ANGLES
1/2"
DUCT SURFACE


MOUNTING ANGLES
DUCT SURFACE
FLEXIBLE SEALANT AS REQUIRED FOR SMOKE SEAL
J TRACK
1" FIRE-SHIELD SHAFTLINER
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

DATE: 11/05/13	2 HOUR SHAFTWALL WITH DUCT PENETRATION
SCALE: 3"=1'-0"	DETAIL: SW 702

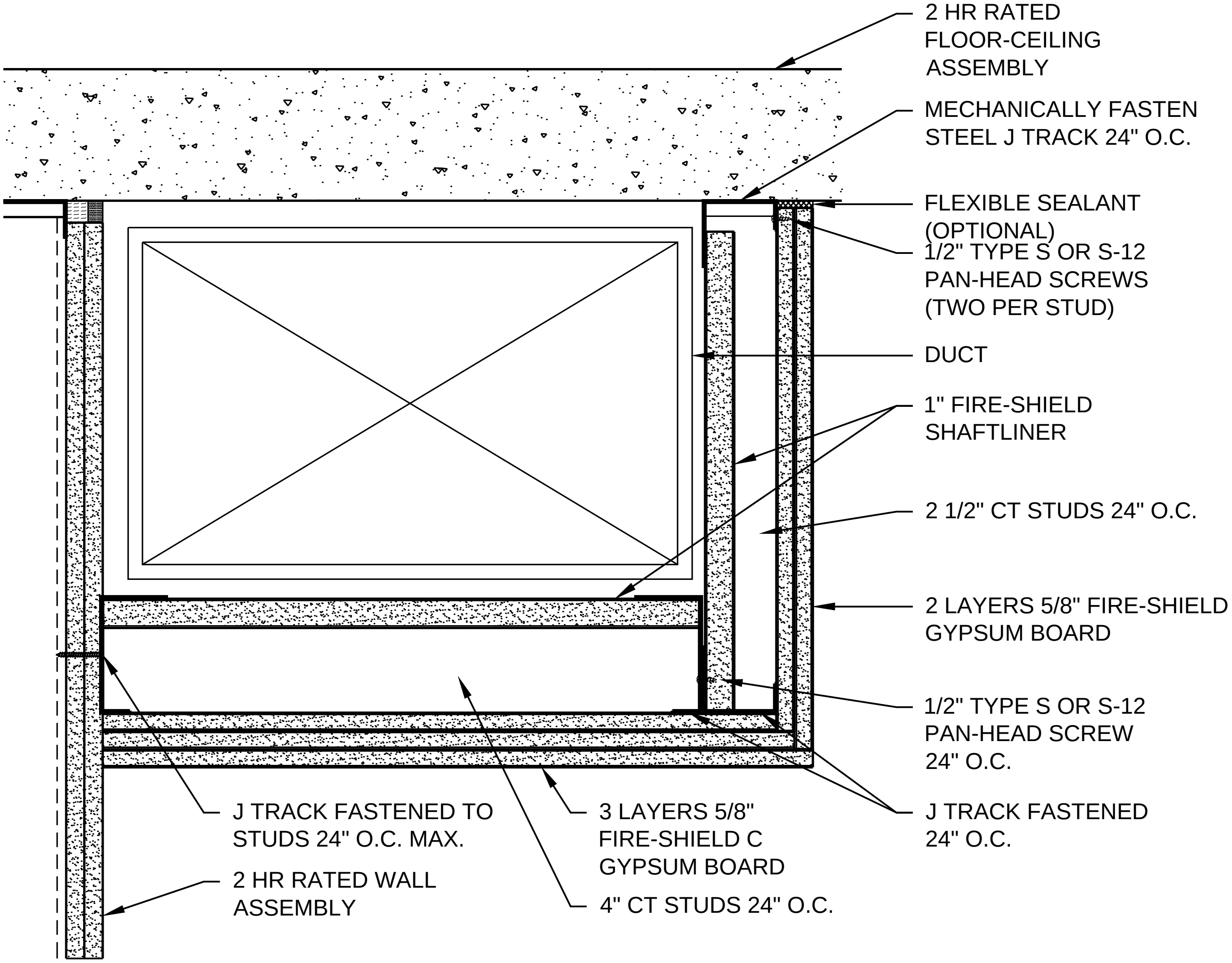

CONCRETE OR FLUTED
STEEL DECK
8 GA. HANGER WIRE
24" O.C.
6" STEEL C TRACK 25 GA.
2" x 6" MINERAL WOOL
1" FIRE-SHIELD
SHAFTLINER
4" CT STUDS 20 GA.
4" J TRACK 20 GA. EACH
SIDE OF C TRACK
3 LAYERS 5/8" GOLD
BOND FIRE-SHIELD C
GYPSUM BOARD


C TRACK
INSTALL 2 PAN HEAD
SCREW OPPOSITE C
TRACK FLANGES 24" O.C.

HANGER ASSEMBLY DETAIL
(REQUIRED FOR SPANS GREATER THAN 8'-0")

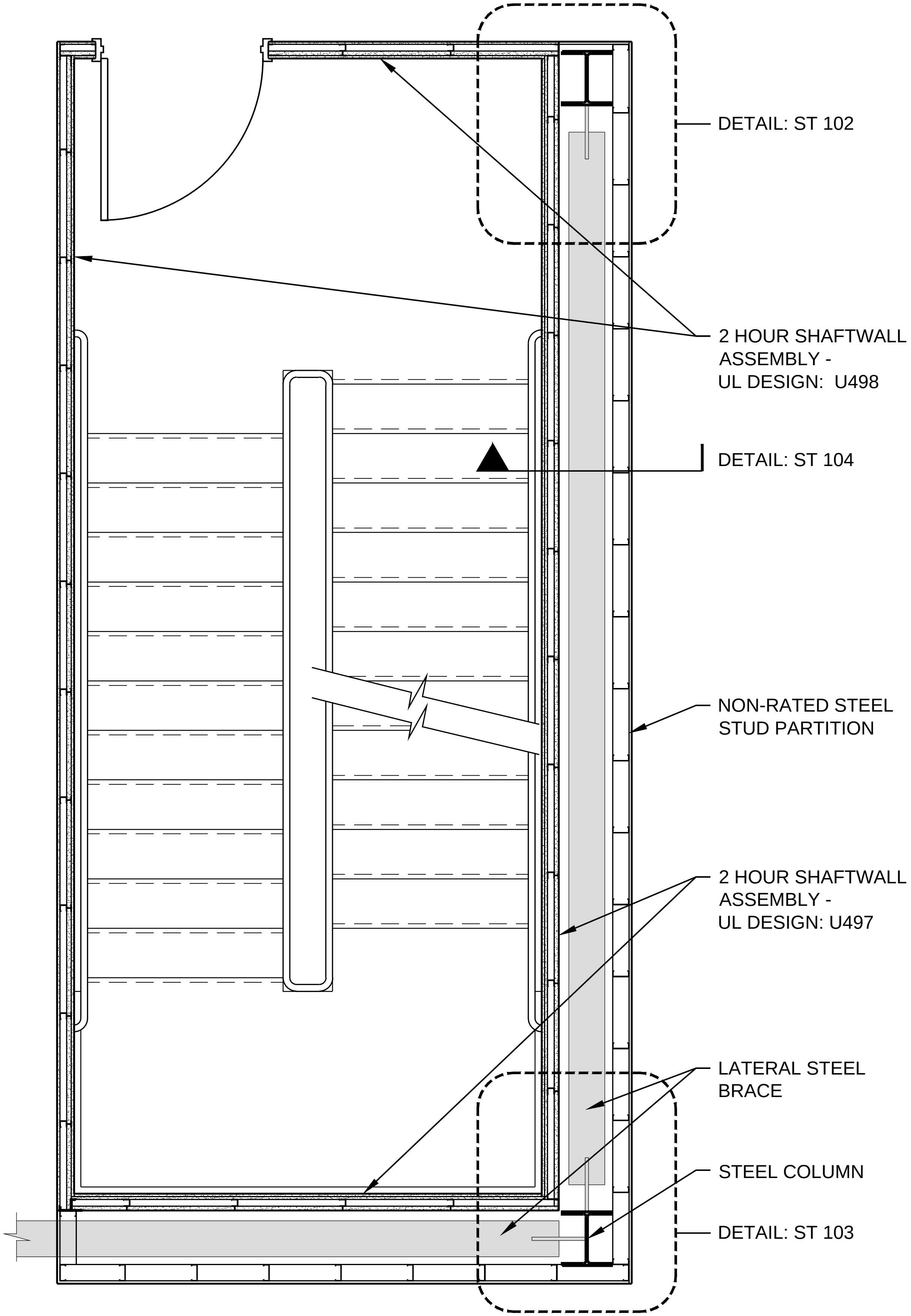
FLOOR-CEILING - 2 HR
UL DESIGN: G586

DATE: 11/05/13	2 HOUR HORIZONTAL SHAFTWALL	National Gypsum
SCALE: 3"=1'-0"	DETAIL: SW 703	

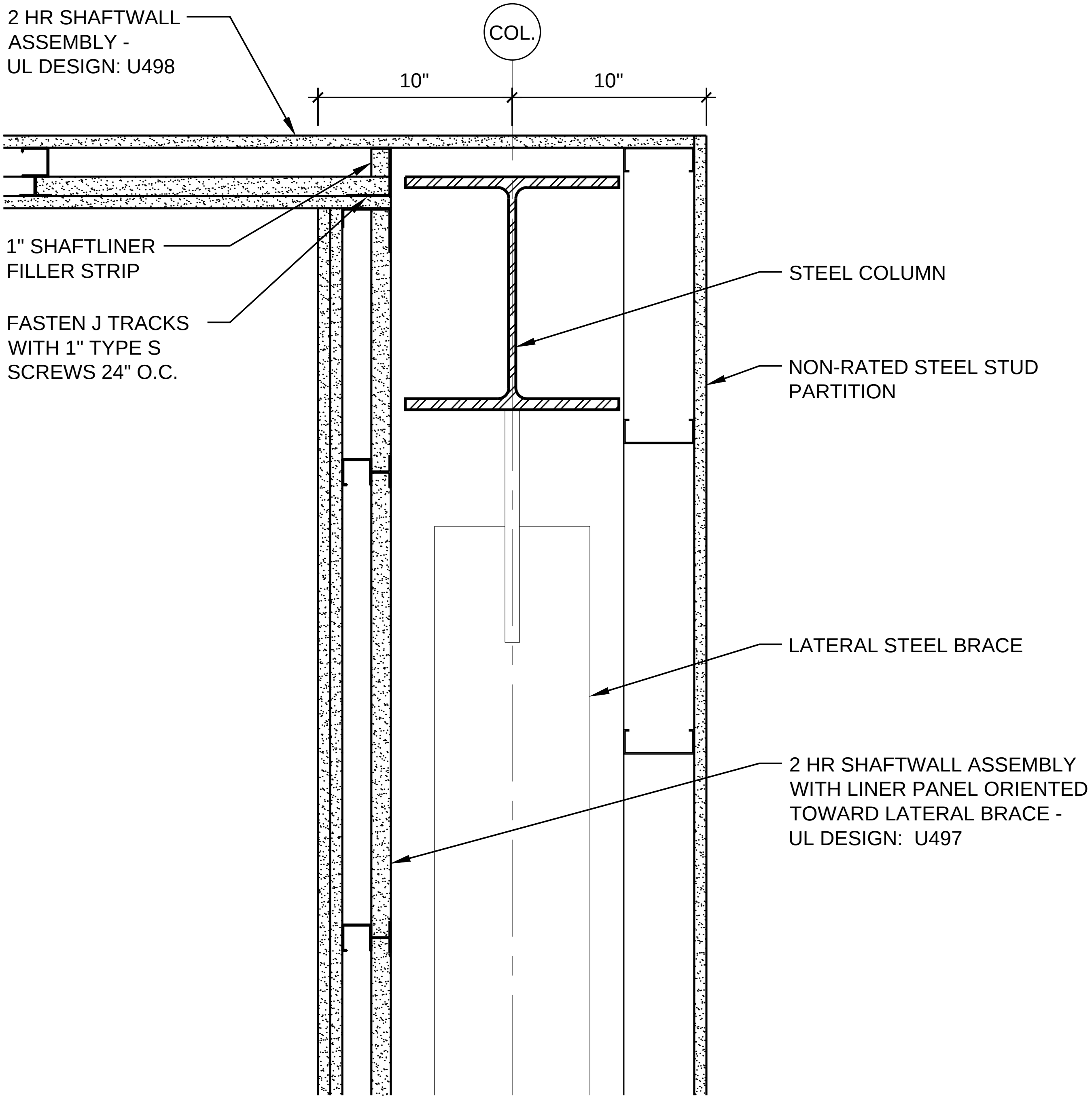

2 HR RATED FLOOR-CEILING ASSEMBLY
MECHANICALLY FASTEN STEEL J TRACK 24" O.C.
FLEXIBLE SEALANT (OPTIONAL)
1/2" TYPE S OR S-12 PAN-HEAD SCREWS (TWO PER STUD)
DUCT
1" FIRE-SHIELD SHAFTLINER
2 1/2" CT STUDS 24" O.C.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1/2" TYPE S OR S-12 PAN-HEAD SCREW 24" O.C.
J TRACK FASTENED TO STUDS 24" O.C. MAX.
3 LAYERS 5/8" FIRE-SHIELD C GYPSUM BOARD
J TRACK FASTENED 24" O.C.
2 HR RATED WALL ASSEMBLY
4" CT STUDS 24" O.C.

VERTICAL - 2 HR
UL DESIGN: U497
HORIZONTAL - 2 HR
UL DESIGN: G586

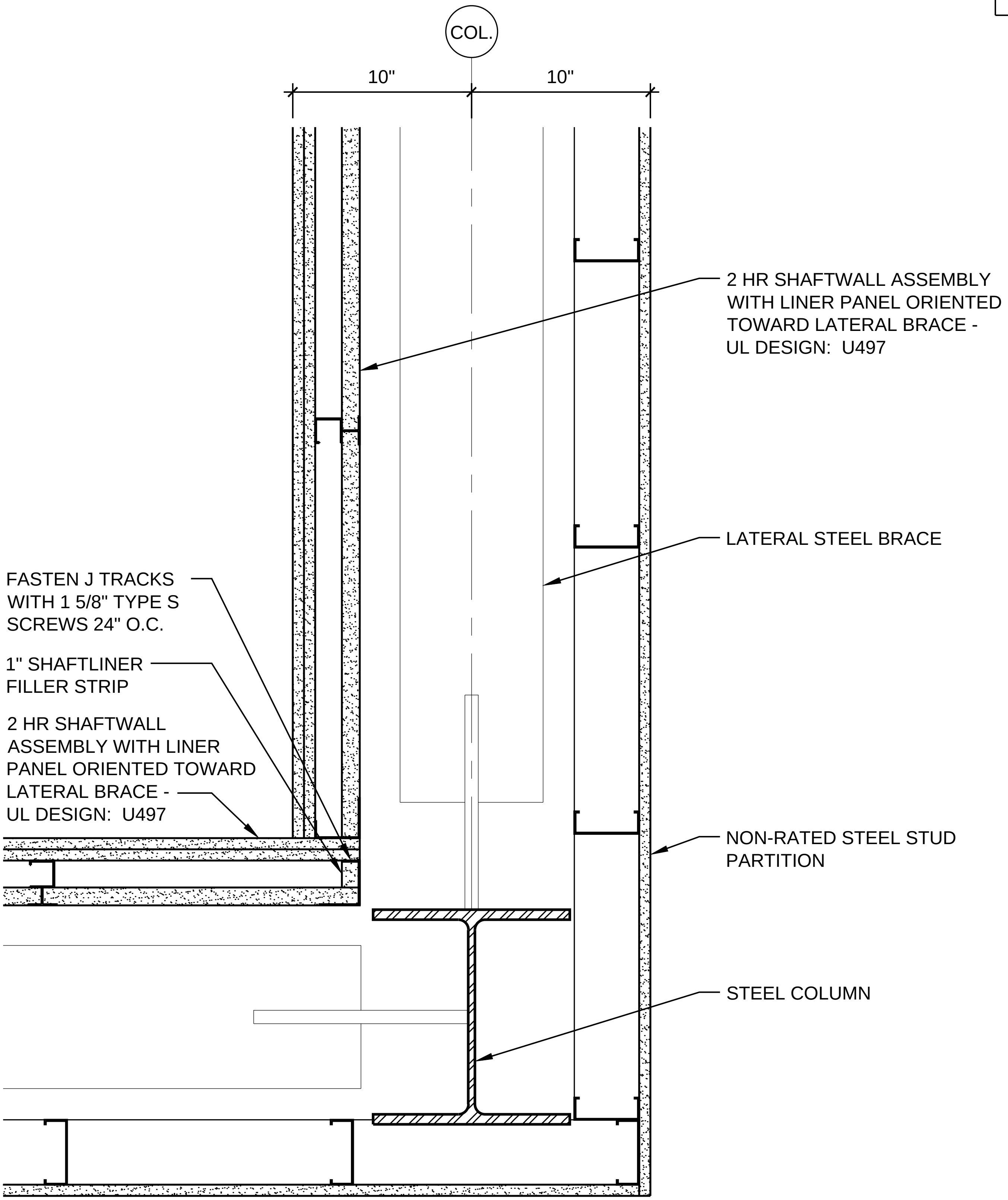
DATE: 11/05/13	2 HOUR HORIZONTAL DUCT PROTECTION	National Gypsum
SCALE: 2"=1'-0"	DETAIL: SW 704	


DETAIL: ST 102
2 HOUR SHAFTWALL ASSEMBLY - UL DESIGN: U498
DETAIL: ST 104
NON-RATED STEEL STUD PARTITION
2 HOUR SHAFTWALL ASSEMBLY - UL DESIGN: U497
LATERAL STEEL BRACE
STEEL COLUMN
DETAIL: ST 103

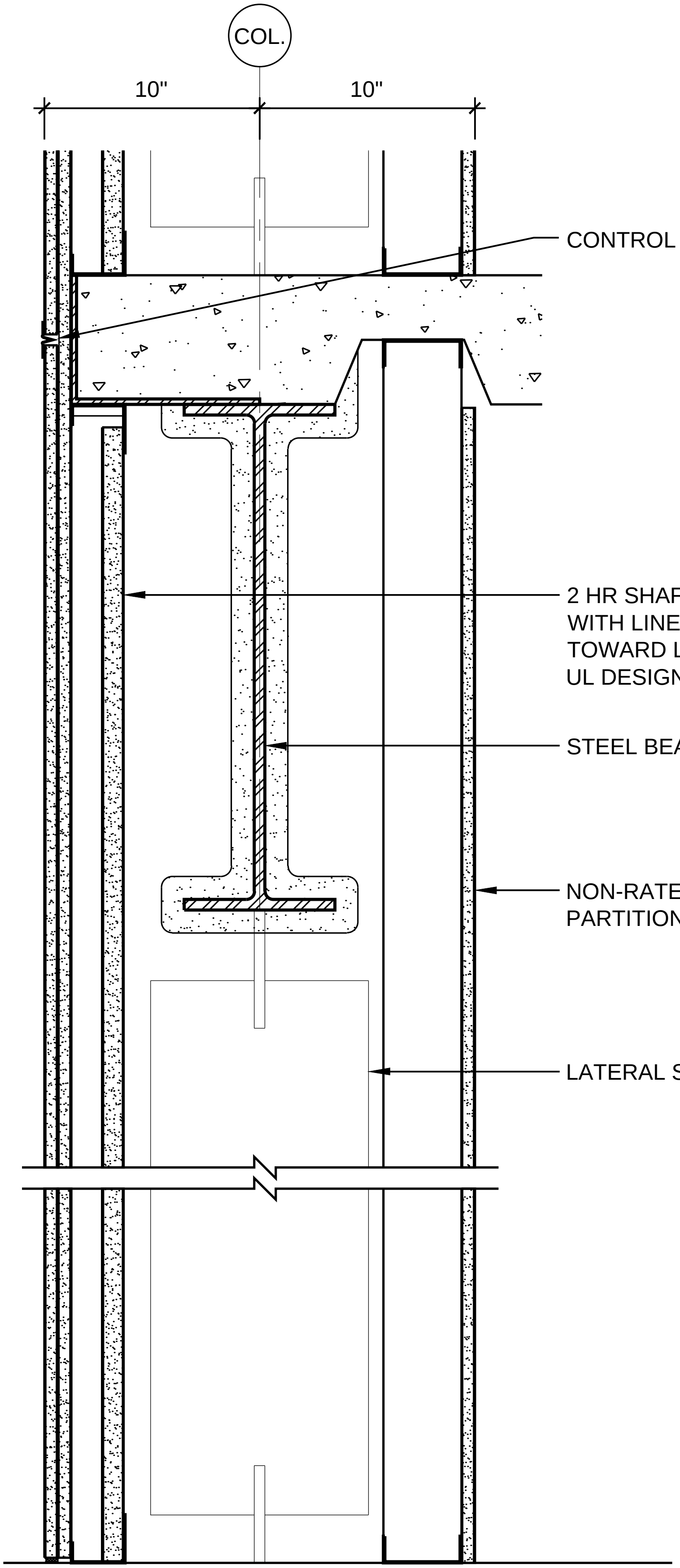
DATE: 11/05/13	FLOOR PLAN OF STAIR AT LATERAL BRACE	National Gypsum
SCALE: 3/8"=1'-0"	DETAIL: ST 101	


2 HR SHAFTWALL ASSEMBLY - UL DESIGN: U498
COL.
10"
10"
1" SHAFTLINER FILLER STRIP
FASTEN J TRACKS WITH 1" TYPE S SCREWS 24" O.C.
STEEL COLUMN
NON-RATED STEEL STUD PARTITION
LATERAL STEEL BRACE
2 HR SHAFTWALL ASSEMBLY WITH LINER PANEL ORIENTED TOWARD LATERAL BRACE - UL DESIGN: U497

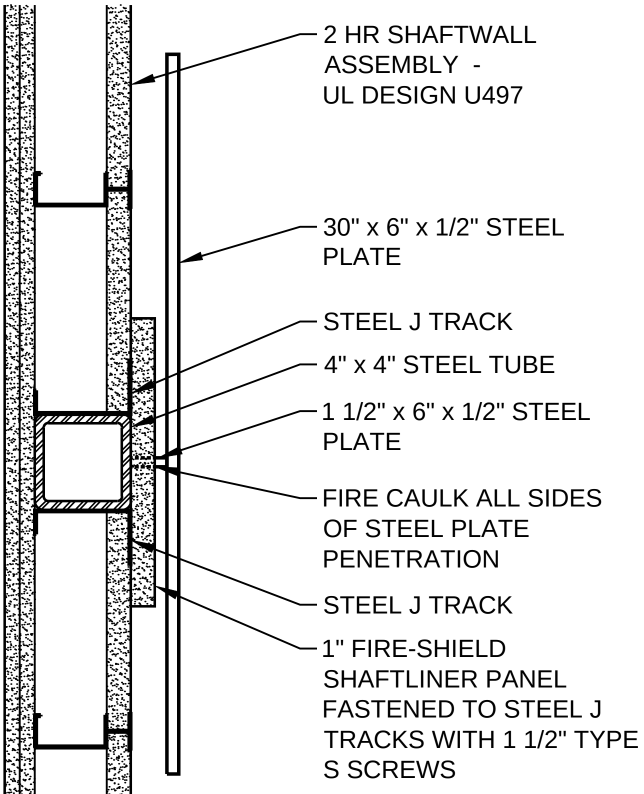
DATE: 11/05/13	STAIR SHAFTWALL CORNER AT LATERAL BRACE	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: ST 102	


COL.
10"
10"
2 HR SHAFTWALL ASSEMBLY WITH LINER PANEL ORIENTED TOWARD LATERAL BRACE - UL DESIGN: U497
LATERAL STEEL BRACE
FASTEN J TRACKS WITH 1 5/8" TYPE S SCREWS 24" O.C.
1" SHAFTLINER FILLER STRIP
2 HR SHAFTWALL ASSEMBLY WITH LINER PANEL ORIENTED TOWARD LATERAL BRACE - UL DESIGN: U497
NON-RATED STEEL STUD PARTITION
STEEL COLUMN

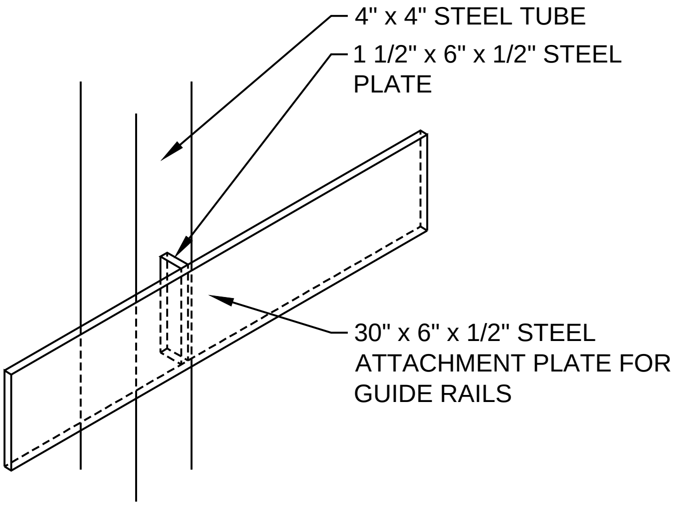
DATE: 11/05/13	STAIR SHAFTWALL CORNER AT LATERAL BRACE	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: ST 103	


COL.
10"
10"
CONTROL JOINT
2 HR SHAFTWALL ASSEMBLY
WITH LINER PANEL ORIENTED
TOWARD LATERAL BRACE
UL DESIGN: U497
STEEL BEAM
NON-RATED STEEL STUD
PARTITION
LATERAL STEEL BRACE

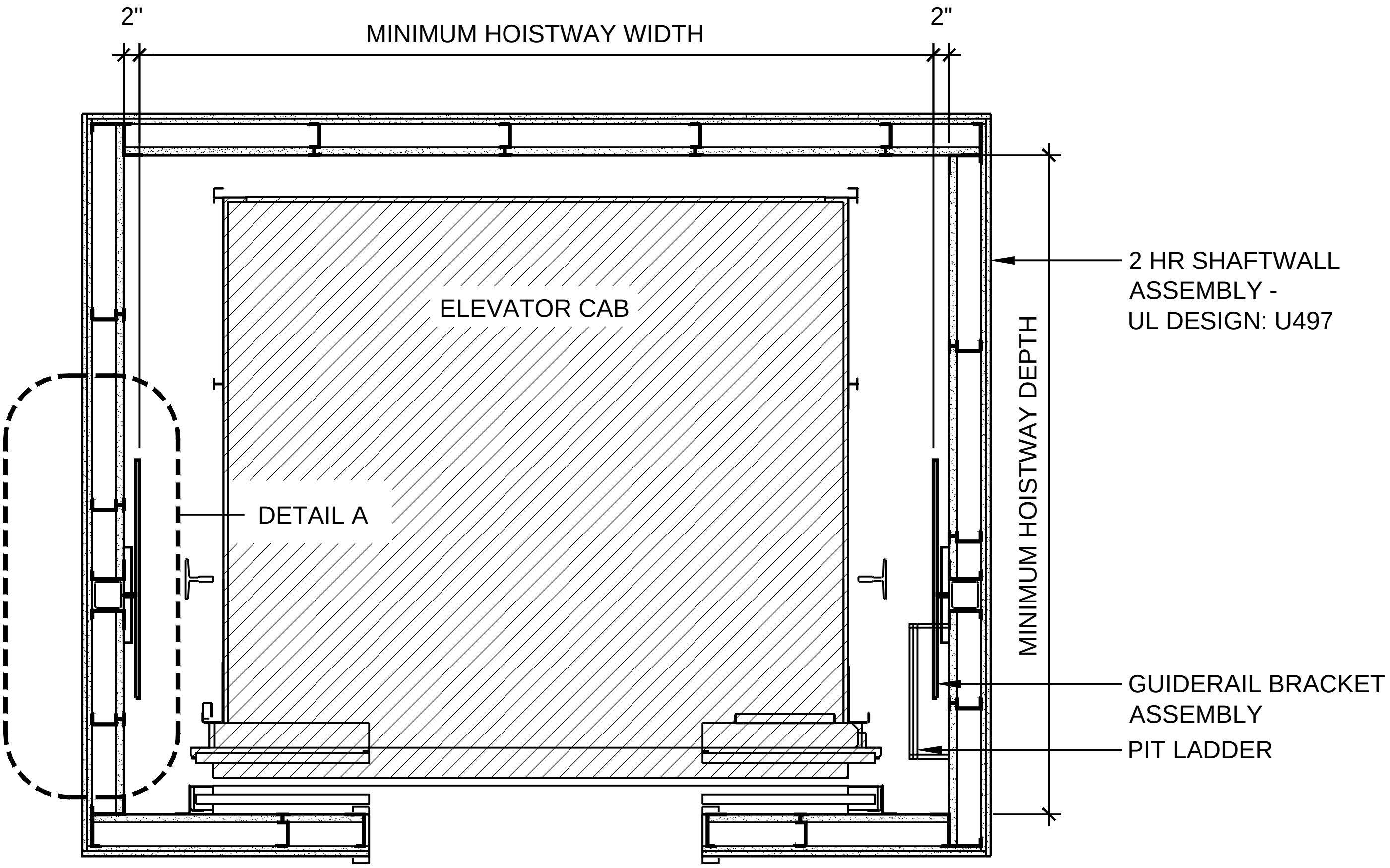
DATE: 11/05/13	STAIR SHAFTWALL SECTION AT LATERAL BRACE	National Gypsum®
SCALE: 1 1/2"=1'-0"	DETAIL: ST 104	


2 HR SHAFTWALL ASSEMBLY - UL DESIGN U497
30" x 6" x 1/2" STEEL PLATE
STEEL J TRACK
4" x 4" STEEL TUBE
1 1/2" x 6" x 1/2" STEEL PLATE
FIRE CAULK ALL SIDES OF STEEL PLATE PENETRATION
STEEL J TRACK
1" FIRE-SHIELD SHAFTLINER PANEL FASTENED TO STEEL J TRACKS WITH 1 1/2" TYPE S SCREWS

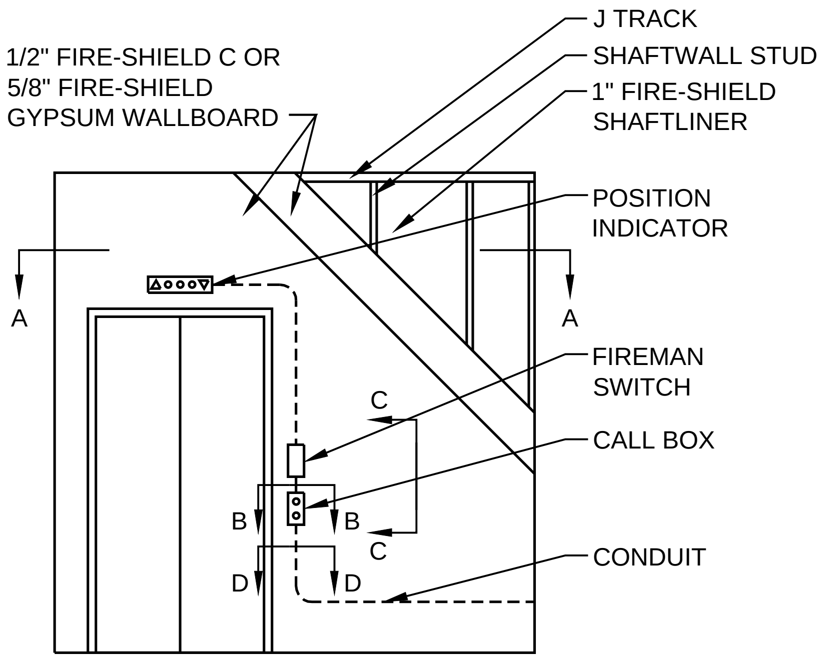
DETAIL A

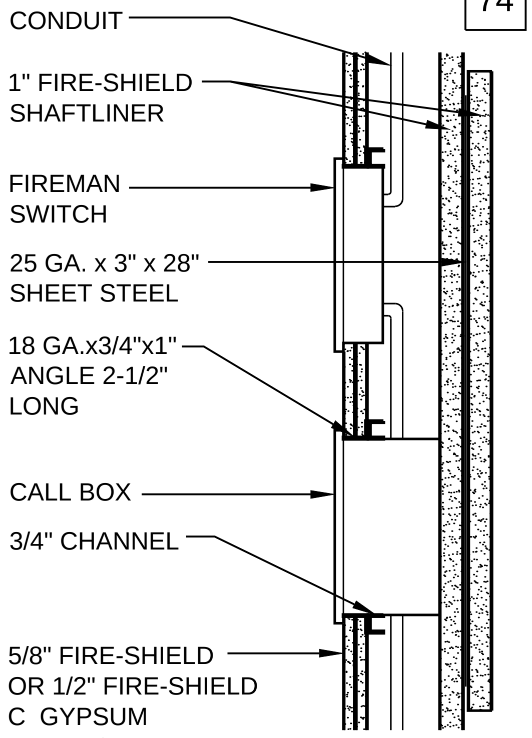

4" x 4" STEEL TUBE
1 1/2" x 6" x 1/2" STEEL PLATE
30" x 6" x 1/2" STEEL ATTACHMENT PLATE FOR GUIDE RAILS

GUIDE RAIL BRACKET ASSEMBLY

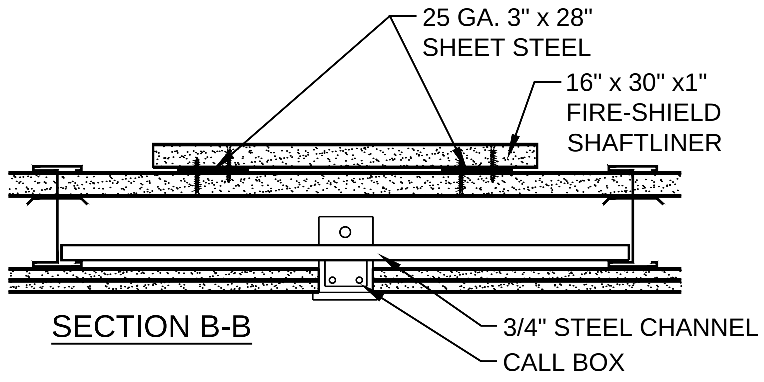

2"
MINIMUM HOISTWAY WIDTH
2"
ELEVATOR CAB
DETAIL A
MINIMUM HOISTWAY DEPTH
2 HR SHAFTWALL ASSEMBLY - UL DESIGN: U497
GUIDERAIL BRACKET ASSEMBLY
PIT LADDER

DATE: 11/05/13	ELEVATOR SHAFT ENCLOSURE PLAN	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: EV 101	

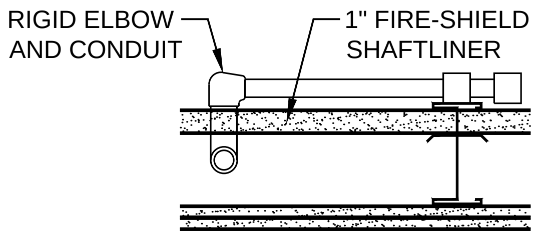

J TRACK
SHAFTWALL STUD
1/2" FIRE-SHIELD C OR 5/8" FIRE-SHIELD GYPSUM WALLBOARD
1" FIRE-SHIELD SHAFTLINER
POSITION INDICATOR
A
A
FIREMAN SWITCH
C
CALL BOX
B
B
C
D
D
CONDUIT


CONDUIT
1" FIRE-SHIELD SHAFTLINER
FIREMAN SWITCH
25 GA. x 3" x 28" SHEET STEEL
18 GA.x3/4"x1" ANGLE 2-1/2" LONG
CALL BOX
3/4" CHANNEL
5/8" FIRE-SHIELD OR 1/2" FIRE-SHIELD C GYPSUM WALLBOARD

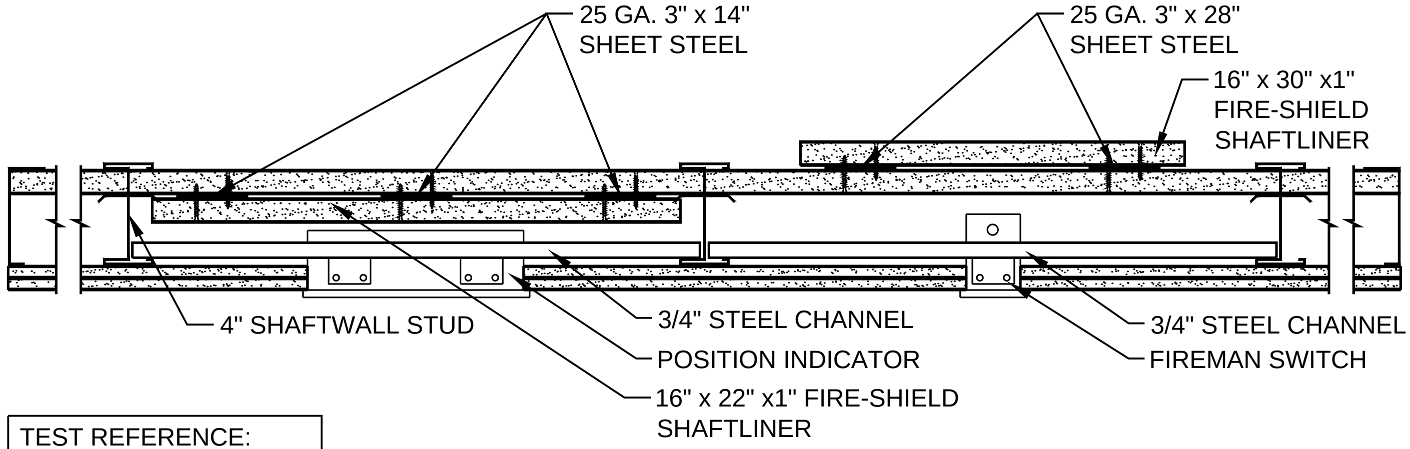
SECTION C-C


25 GA. 3" x 28" SHEET STEEL
16" x 30" x1" FIRE-SHIELD SHAFTLINER
3/4" STEEL CHANNEL
CALL BOX

SECTION B-B


RIGID ELBOW AND CONDUIT
1" FIRE-SHIELD SHAFTLINER

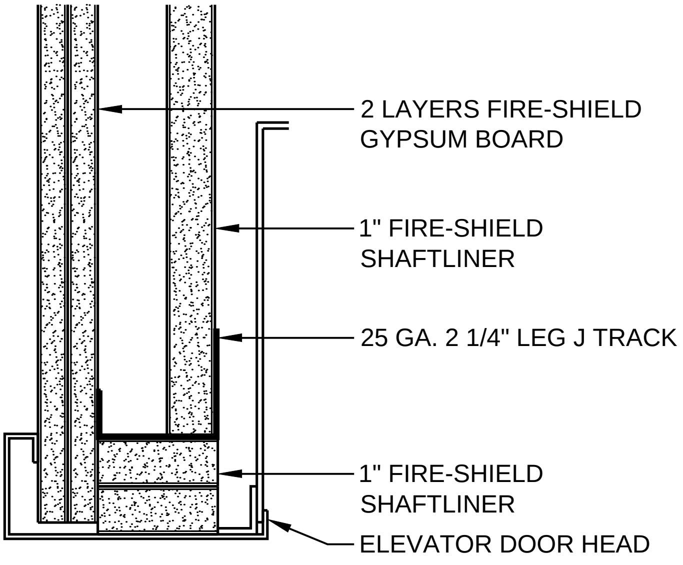
SECTION D-D


25 GA. 3" x 14" SHEET STEEL
25 GA. 3" x 28" SHEET STEEL
16" x 30" x1" FIRE-SHIELD SHAFTLINER
4" SHAFTWALL STUD
3/4" STEEL CHANNEL
POSITION INDICATOR
16" x 22" x1" FIRE-SHIELD SHAFTLINER
3/4" STEEL CHANNEL
FIREMAN SWITCH

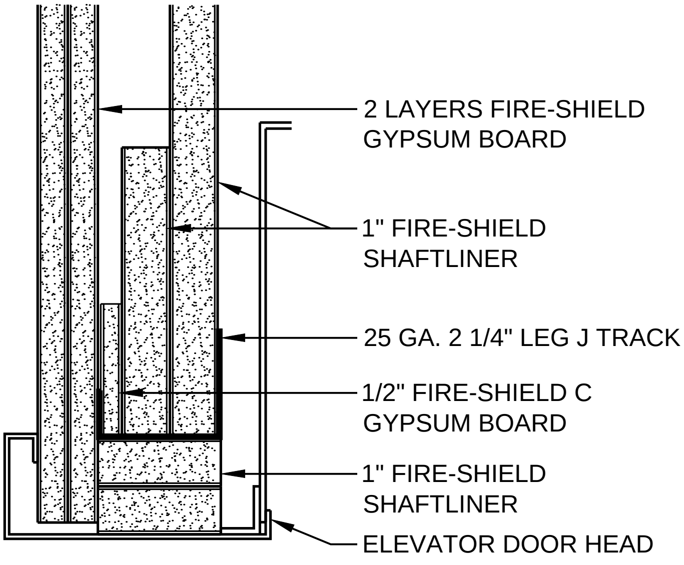
TEST REFERENCE:
FM WP-612
FM WP-621

SECTION A-A

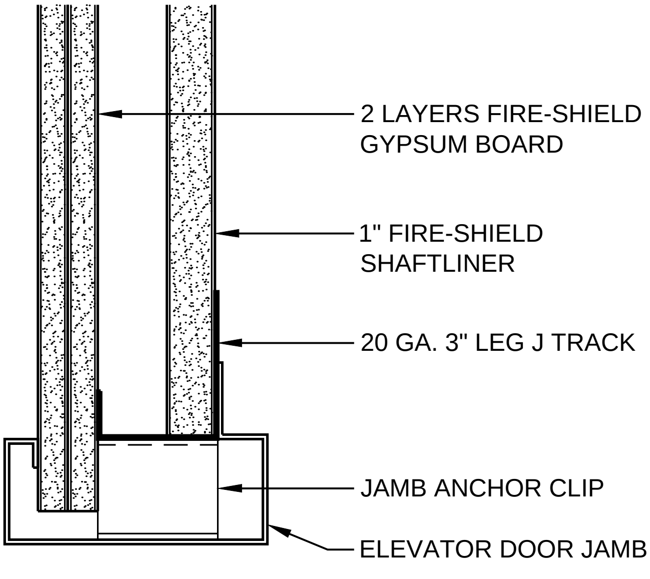
DATE: 11/05/13	POSITION INDICATOR AND CONTROL BOX PROTECTION IN ELEVATOR SHAFTWALL	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: EV 102	


2 LAYERS FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
25 GA. 2 1/4" LEG J TRACK
1" FIRE-SHIELD SHAFTLINER
ELEVATOR DOOR HEAD

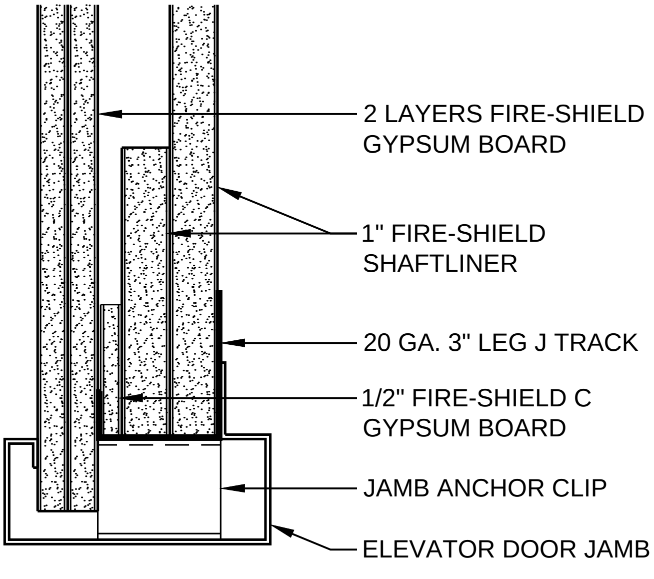
ELEVATOR DOOR HEAD


2 LAYERS FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
25 GA. 2 1/4" LEG J TRACK
1/2" FIRE-SHIELD C GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
ELEVATOR DOOR HEAD

ELEVATOR DOOR HEAD
(FOR ELEVATOR DOORS < 7'-0")

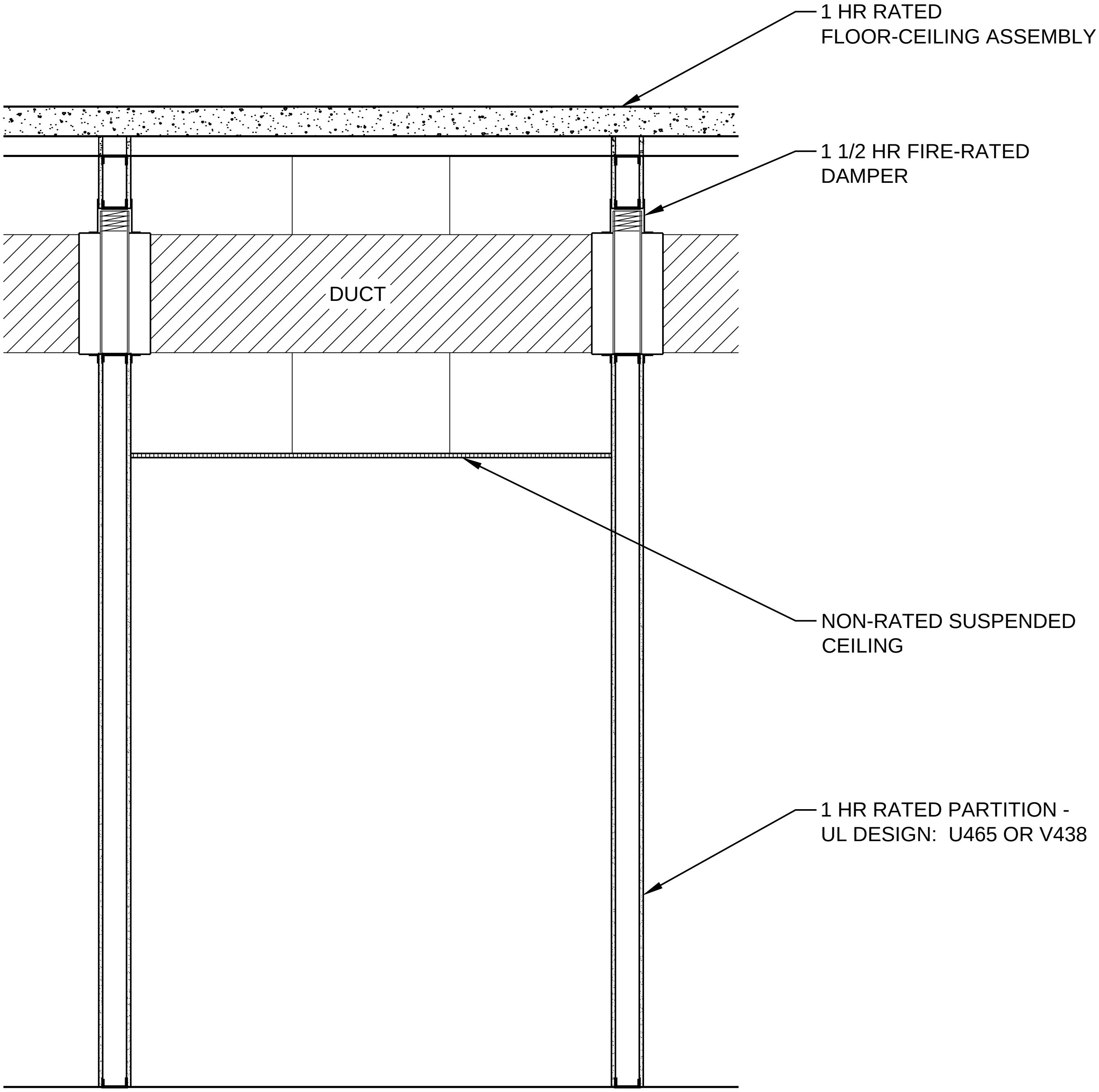

2 LAYERS FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
20 GA. 3" LEG J TRACK
JAMB ANCHOR CLIP
ELEVATOR DOOR JAMB

ELEVATOR DOOR JAMB

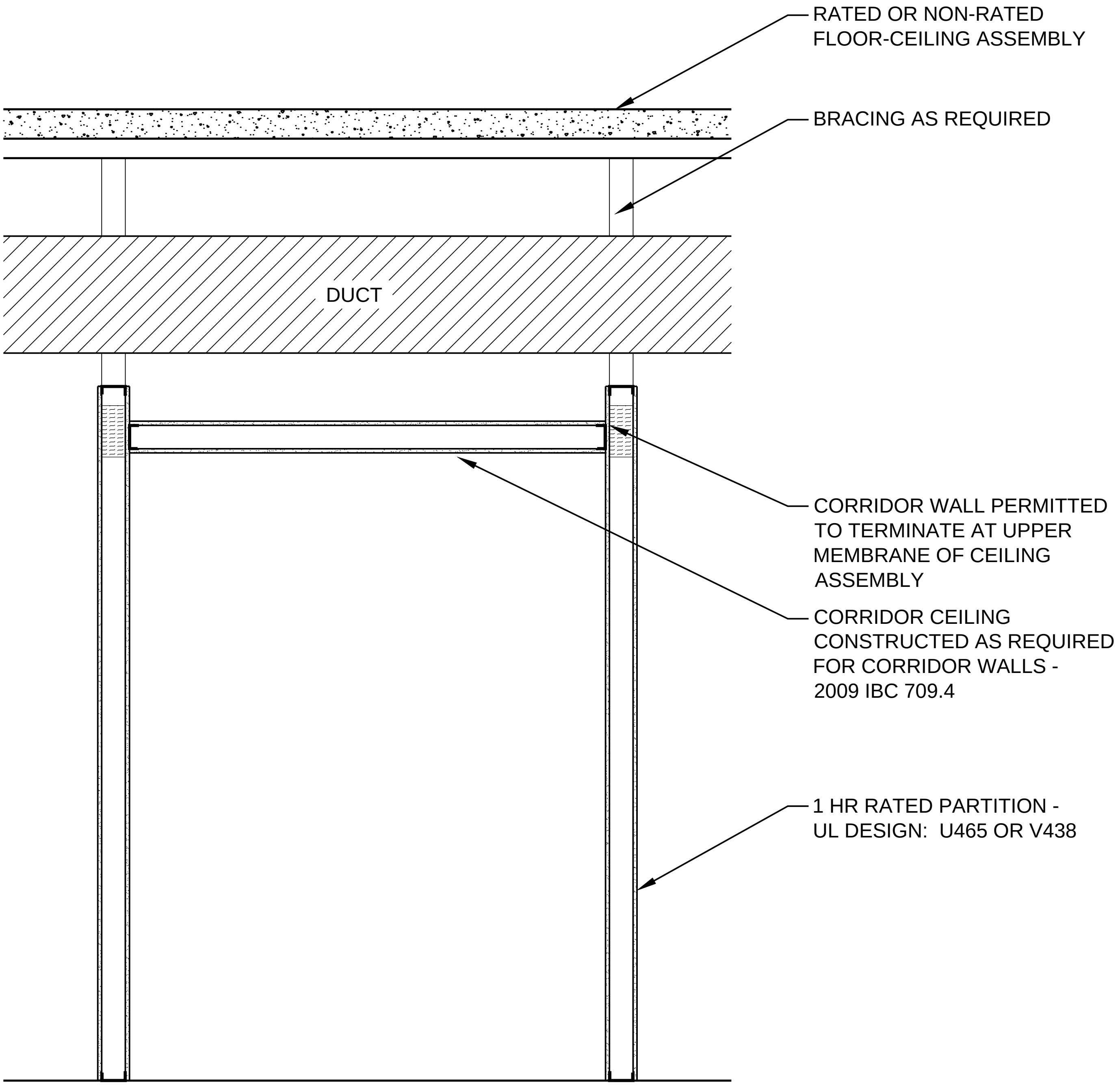

2 LAYERS FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
20 GA. 3" LEG J TRACK
1/2" FIRE-SHIELD C GYPSUM BOARD
JAMB ANCHOR CLIP
ELEVATOR DOOR JAMB

ELEVATOR DOOR JAMB
(FOR ELEVATOR DOORS < 7'-0")

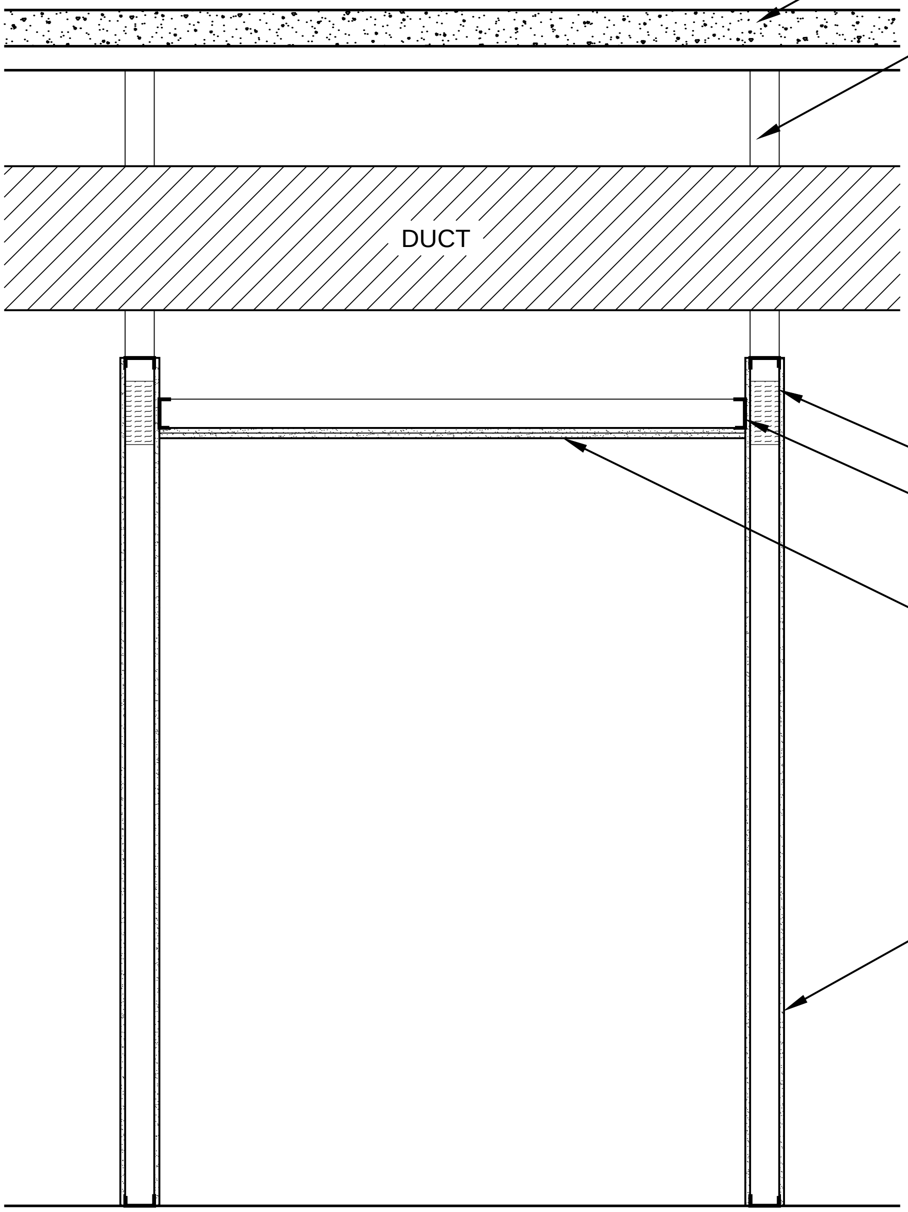
DATE: 11/05/13	ELEVATOR SHAFTWALL HEAD AND JAMB DETAILS	National Gypsum
SCALE: 3"=1'-0"	DETAIL: EV 103	


1 HR RATED
FLOOR-CEILING ASSEMBLY
1 1/2 HR FIRE-RATED
DAMPER
DUCT
NON-RATED SUSPENDED
CEILING
1 HR RATED PARTITION -
UL DESIGN: U465 OR V438

DATE: 11/05/13	1 HOUR CORRIDOR ASSEMBLY
SCALE: 1/2"=1'-0"	DETAIL: CR 101


RATED OR NON-RATED FLOOR-CEILING ASSEMBLY
BRACING AS REQUIRED
DUCT
CORRIDOR WALL PERMITTED TO TERMINATE AT UPPER MEMBRANE OF CEILING ASSEMBLY
CORRIDOR CEILING CONSTRUCTED AS REQUIRED FOR CORRIDOR WALLS - 2009 IBC 709.4
1 HR RATED PARTITION - UL DESIGN: U465 OR V438

DATE: 11/05/13	1 HOUR CORRIDOR ASSEMBLY	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: CR 102	



RATED OR NON-RATED FLOOR-CEILING ASSEMBLY

BRACING AS REQUIRED

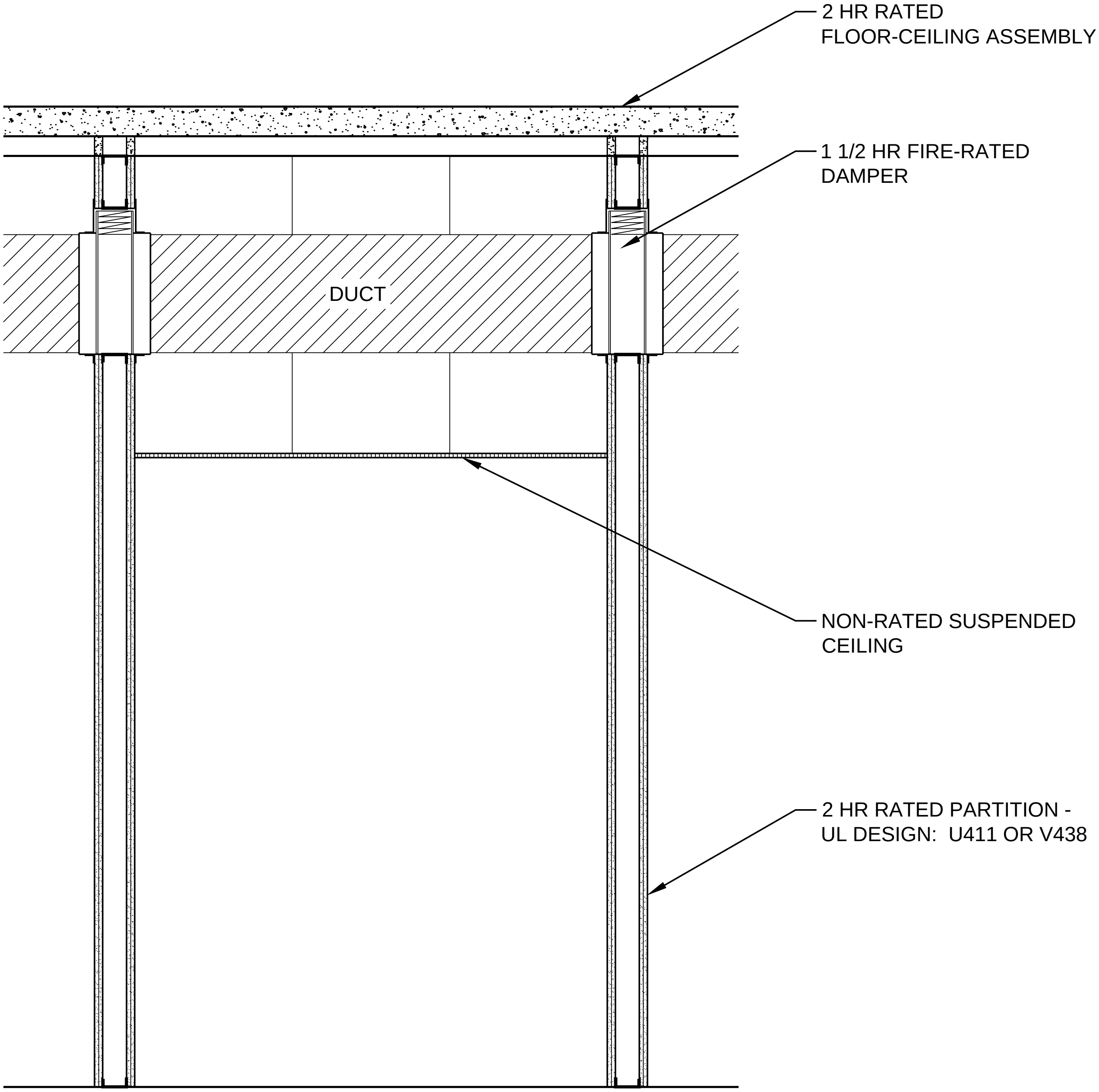
MINERAL WOOL INSULATION

STEEL TRACK - FASTEN TO STUDS WITH 1 5/8" TYPE S SCREWS

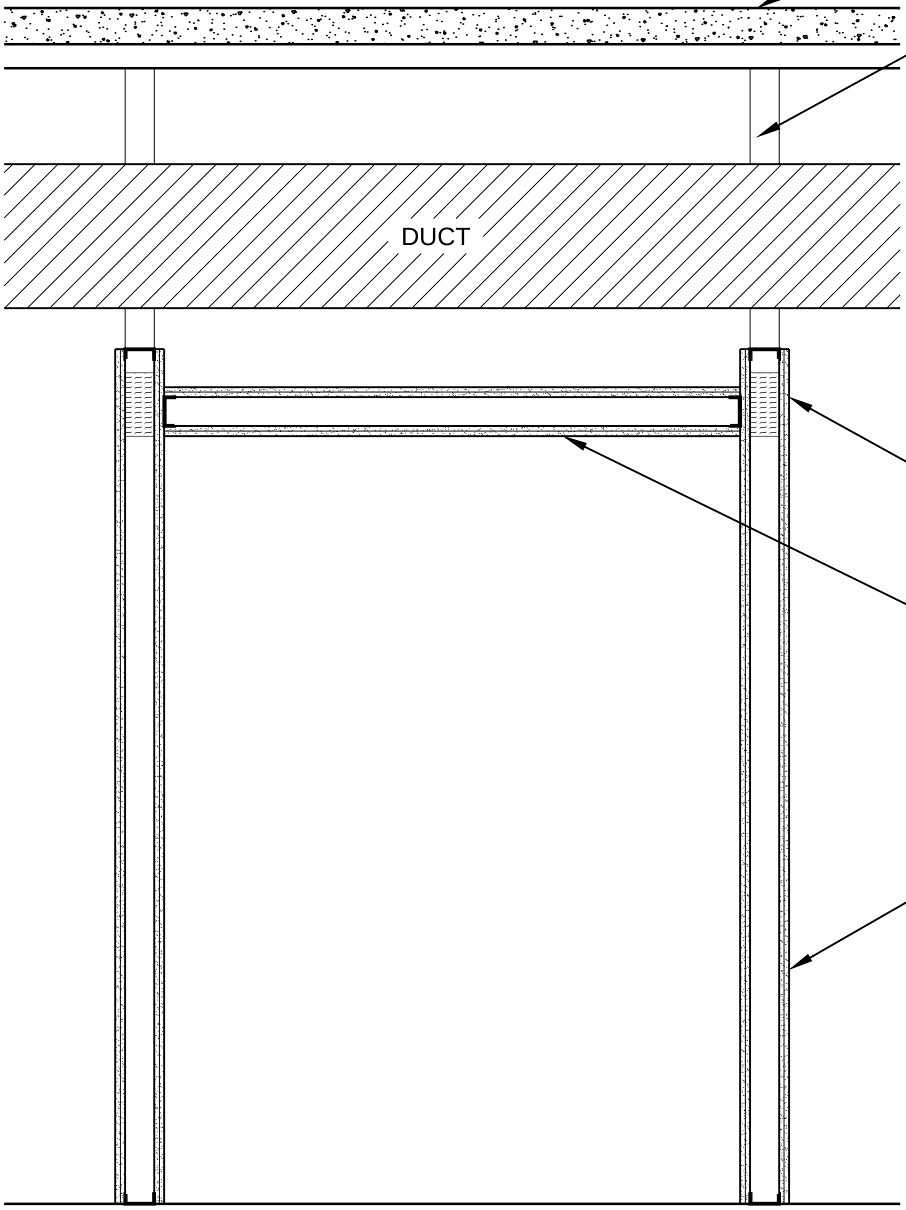
1 HOUR GYPSUM BOARD MEMBRANE -
2 LAYERS 5/8" FIRE-SHIELD WALLBOARD PER GYPSUM ASSOCIATION DOCUMENT GA 610

1 HR RATED PARTITION -
UL DESIGN: U465 OR V438

DATE: 11/05/13	1 HOUR CORRIDOR ASSEMBLY	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: CR 103	


2 HR RATED
FLOOR-CEILING ASSEMBLY
1 1/2 HR FIRE-RATED
DAMPER
DUCT
NON-RATED SUSPENDED
CEILING
2 HR RATED PARTITION -
UL DESIGN: U411 OR V438

DATE: 11/05/13	2 HOUR CORRIDOR ASSEMBLY	National Gypsum.
SCALE: 1/2"=1'-0"	DETAIL: CR 201	



RATED OR NON-RATED FLOOR-CEILING ASSEMBLY

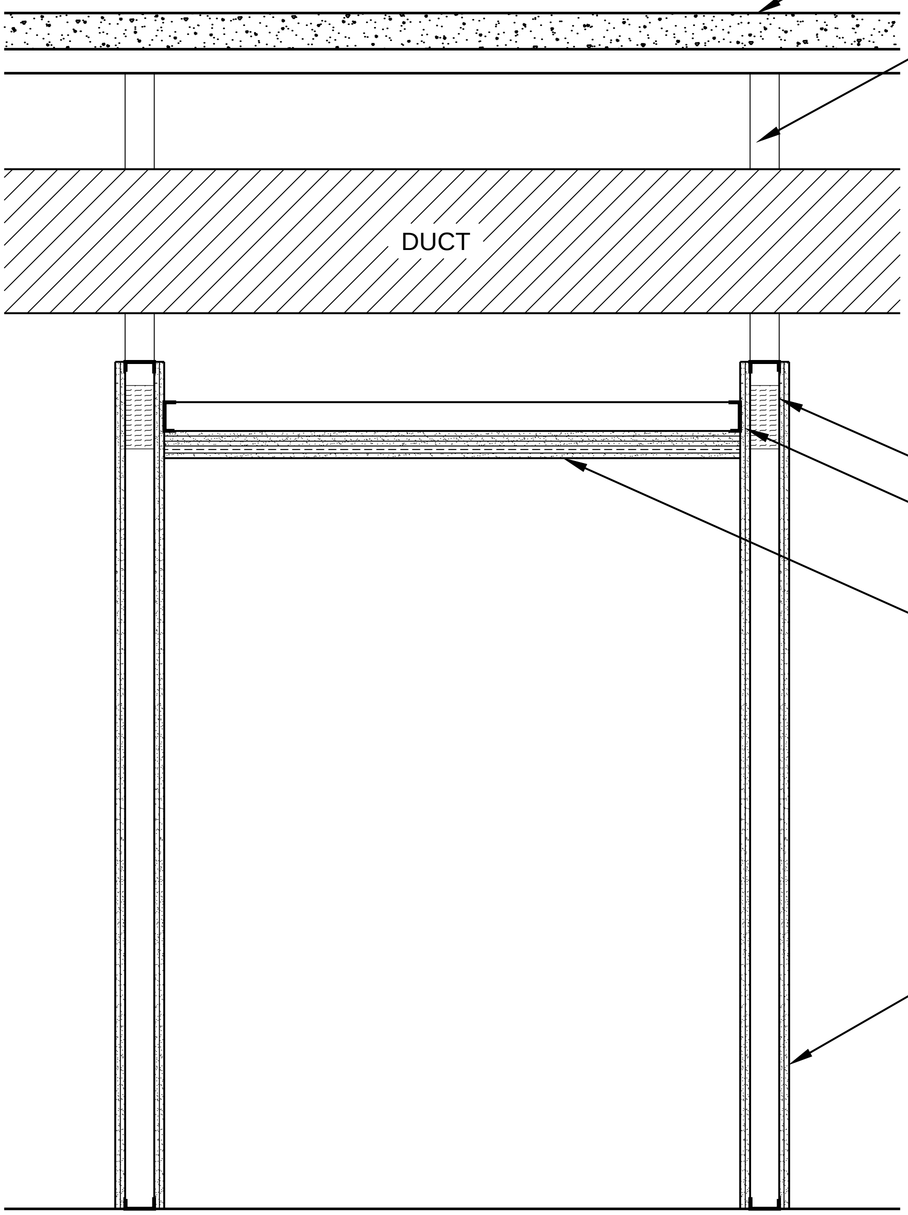
BRACING AS REQUIRED

CORRIDOR WALL PERMITTED TO TERMINATE AT UPPER MEMBRANE OF CEILING ASSEMBLY

CORRIDOR CEILING CONSTRUCTED AS REQUIRED FOR CORRIDOR WALLS - 2009 IBC 709.4

2 HR RATED PARTITION - UL DESIGN: U411 OR V438

DATE: 11/05/13	2 HOUR CORRIDOR ASSEMBLY	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: CR 202	



RATED OR NON-RATED
FLOOR-CEILING ASSEMBLY

BRACING AS REQUIRED

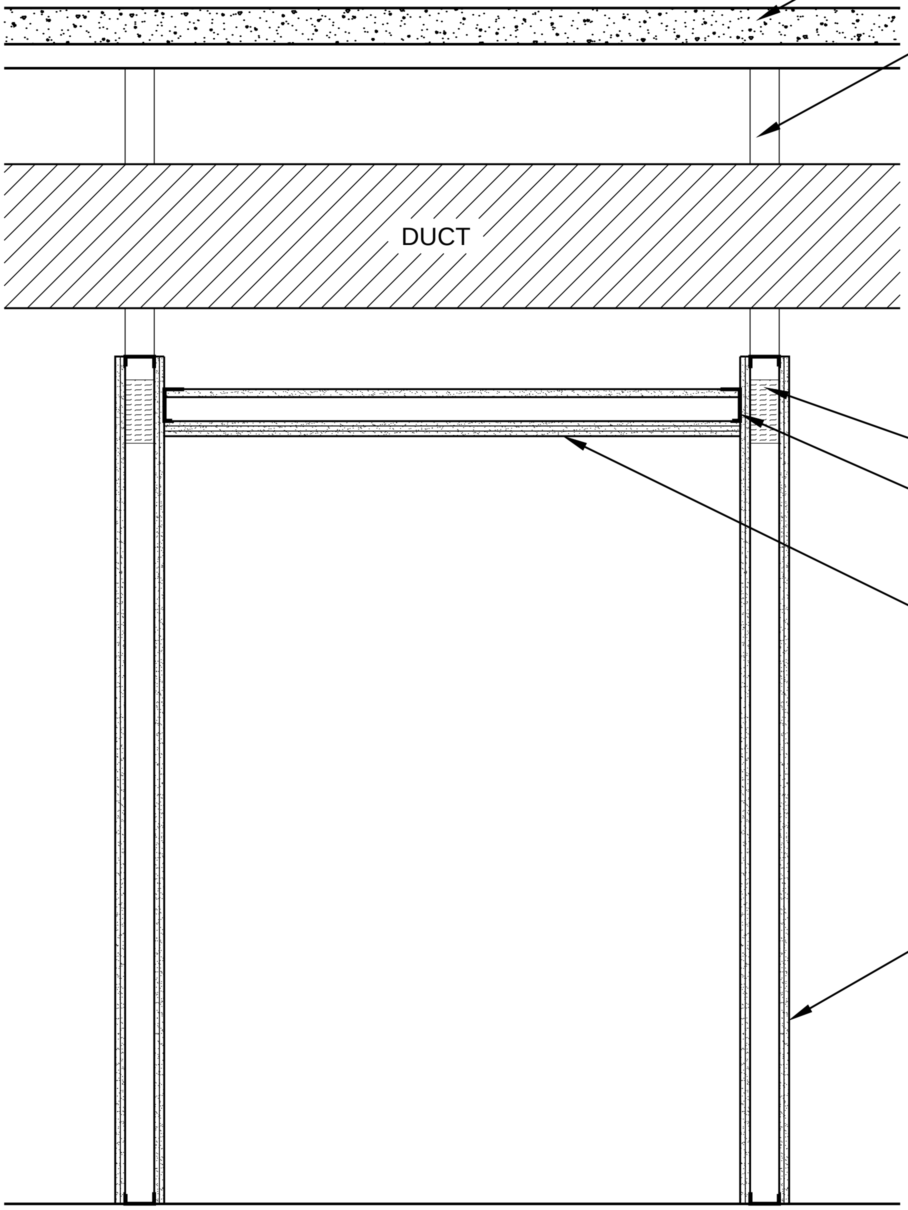
MINERAL WOOL INSULATION

STEEL TRACK - FASTEN TO STUDS WITH 1 5/8" TYPE S SCREWS

2 HOUR GYPSUM BOARD MEMBRANE - 4 LAYERS 5/8" FIRE-SHIELD WALLBOARD WITH 7/8" FURRING CHANNEL BETWEEN 3RD AND FACE LAYER PER GYPSUM ASSOCIATION DOCUMENT GA 610

2 HR RATED PARTITION -
UL DESIGN: U411 OR V438

DATE: 11/05/13	2 HOUR CORRIDOR ASSEMBLY	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: CR 203	



RATED OR NON-RATED
FLOOR-CEILING ASSEMBLY

BRACING AS REQUIRED

MINERAL WOOL INSULATION

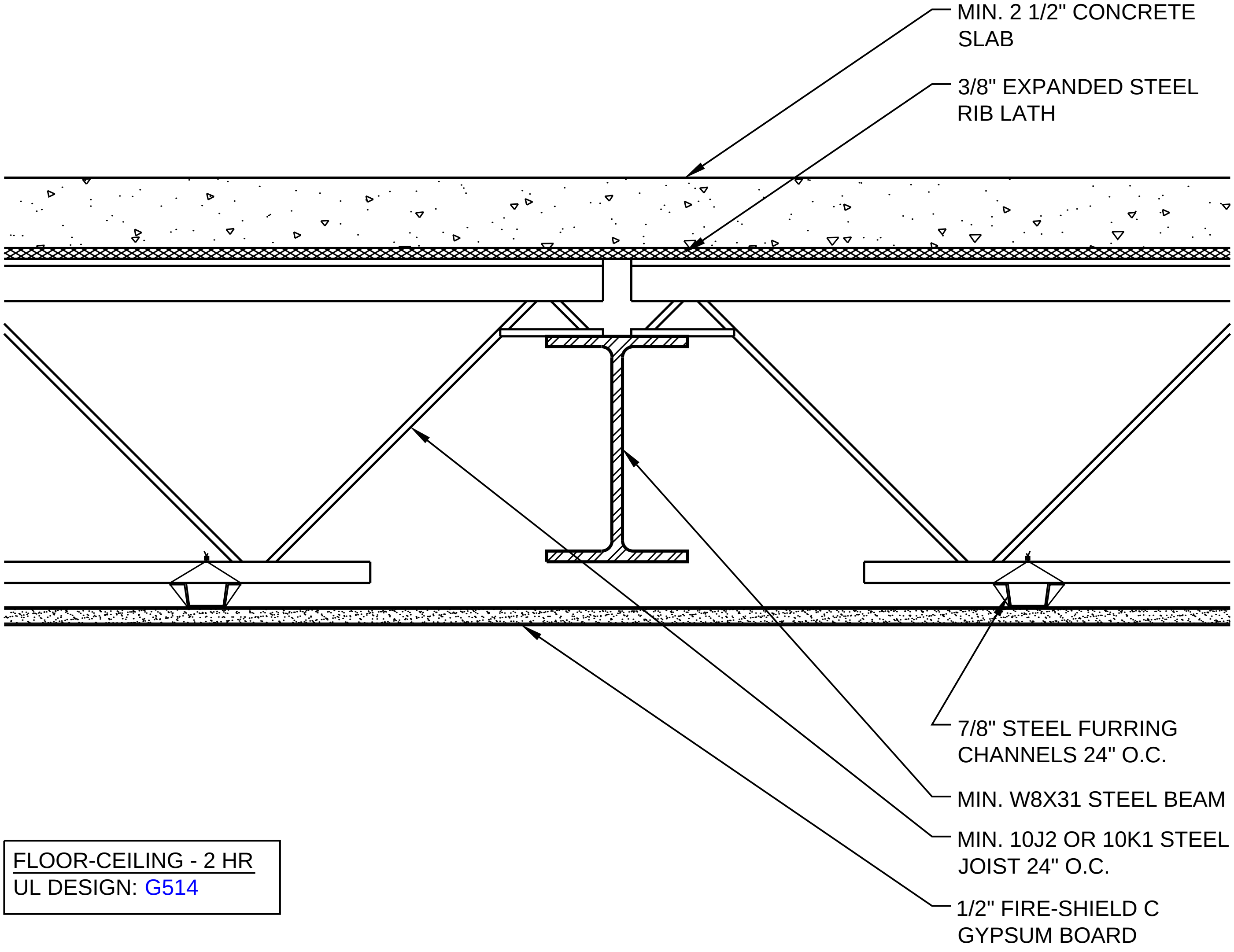
STEEL J TRACK - FASTEN
TO STUDS WITH 1 5/8"
TYPE S SCREWS

HORIZONTAL SHAFTWALL
ASSEMBLY - UL DESIGN:
G586

NOTE:
FOR SPANS GREATER THAN
8'-0" REFER TO DETAIL SW 703
FOR INTERMEDIATE SUPPORTS

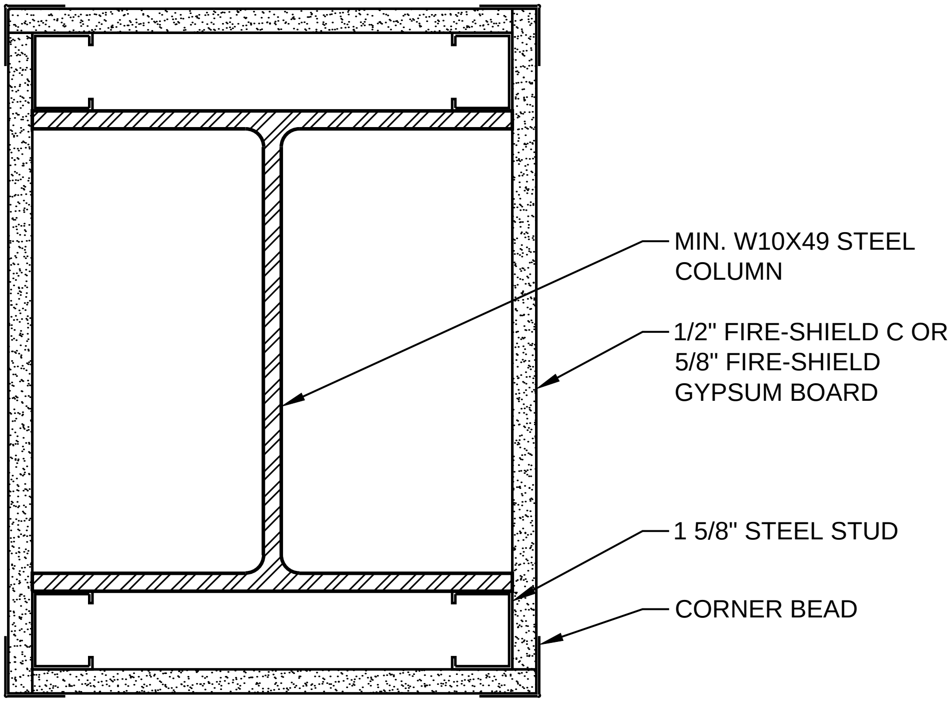
2 HR RATED PARTITION -
UL DESIGN: U411 OR V438

DATE: 11/05/13	2 HOUR CORRIDOR ASSEMBLY	National Gypsum
SCALE: 1/2"=1'-0"	DETAIL: CR 204	


MIN. 2 1/2" CONCRETE SLAB
3/8" EXPANDED STEEL RIB LATH
7/8" STEEL FURRING CHANNELS 24" O.C.
MIN. W8X31 STEEL BEAM
MIN. 10J2 OR 10K1 STEEL JOIST 24" O.C.
1/2" FIRE-SHIELD C GYPSUM BOARD

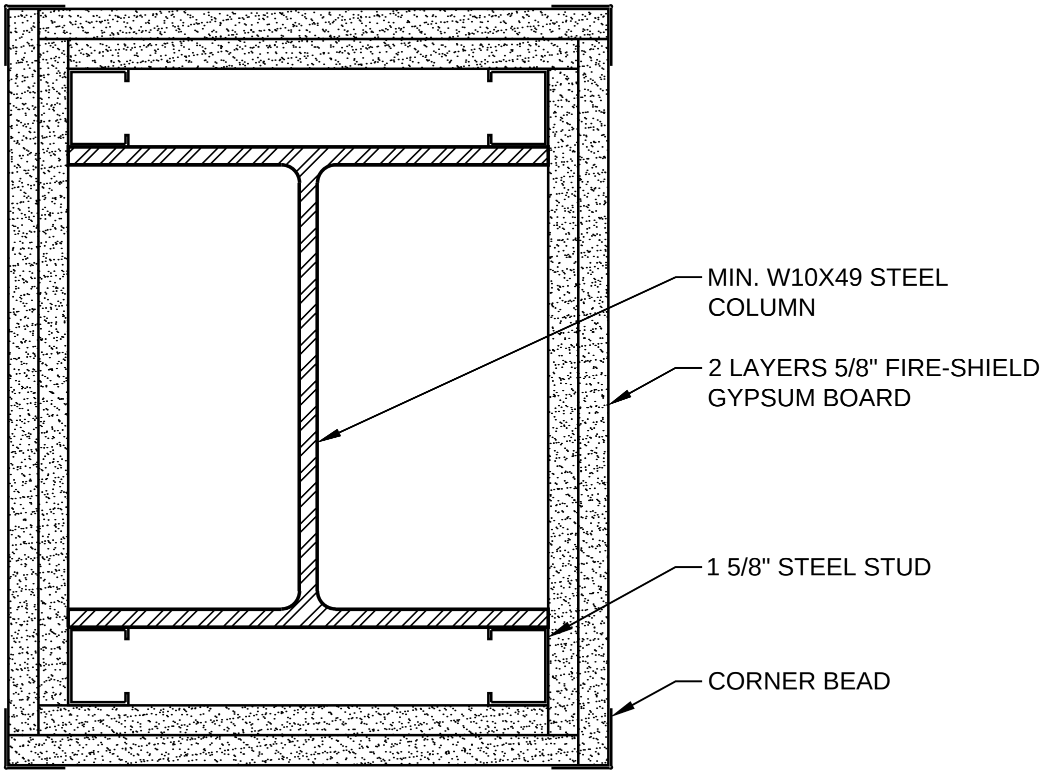
FLOOR-CEILING - 2 HR
UL DESIGN: G514

DATE: 11/05/13	2 HOUR FLOOR-CEILING ASSEMBLY	National Gypsum
SCALE: 2"=1'-0"	DETAIL: FC 202	


MIN. W10X49 STEEL COLUMN
1/2" FIRE-SHIELD C OR 5/8" FIRE-SHIELD GYPSUM BOARD
1 5/8" STEEL STUD
CORNER BEAD

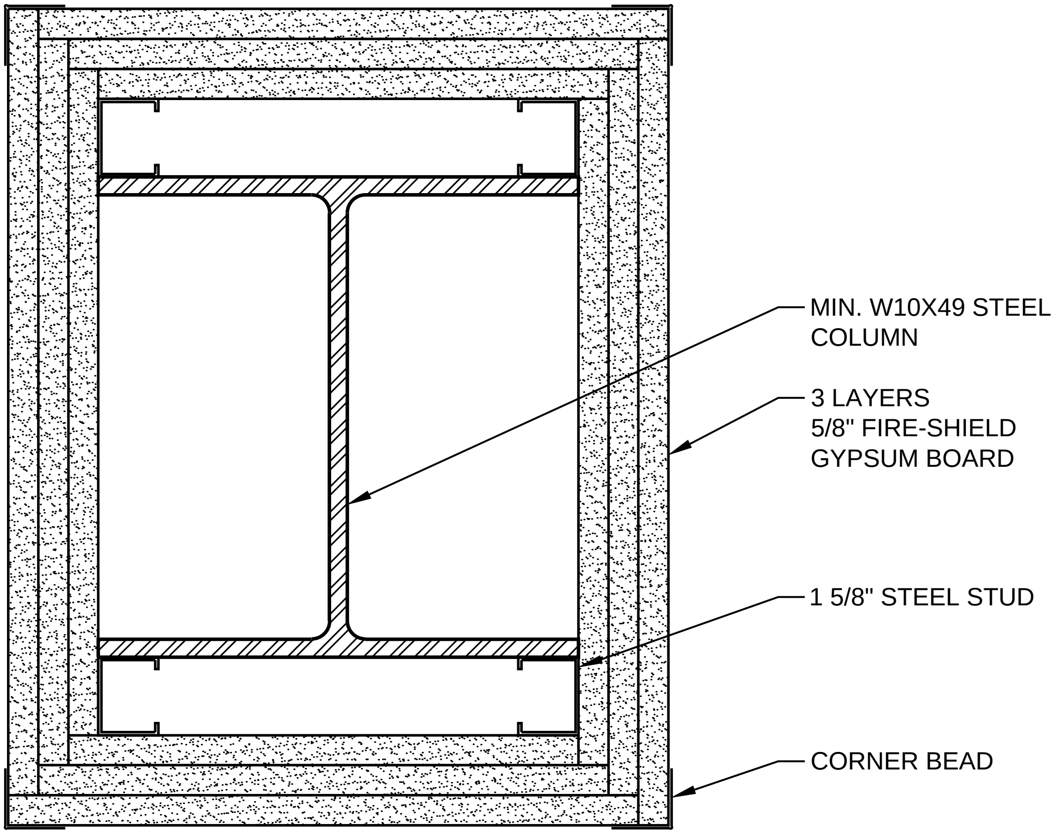
COLUMN - 1 HR
UL DESIGN: X528

DATE: 11/05/13
1 HOUR RATED COLUMN
SCALE: 3"=1'-0"
DETAIL: CL 101


MIN. W10X49 STEEL COLUMN
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1 5/8" STEEL STUD
CORNER BEAD

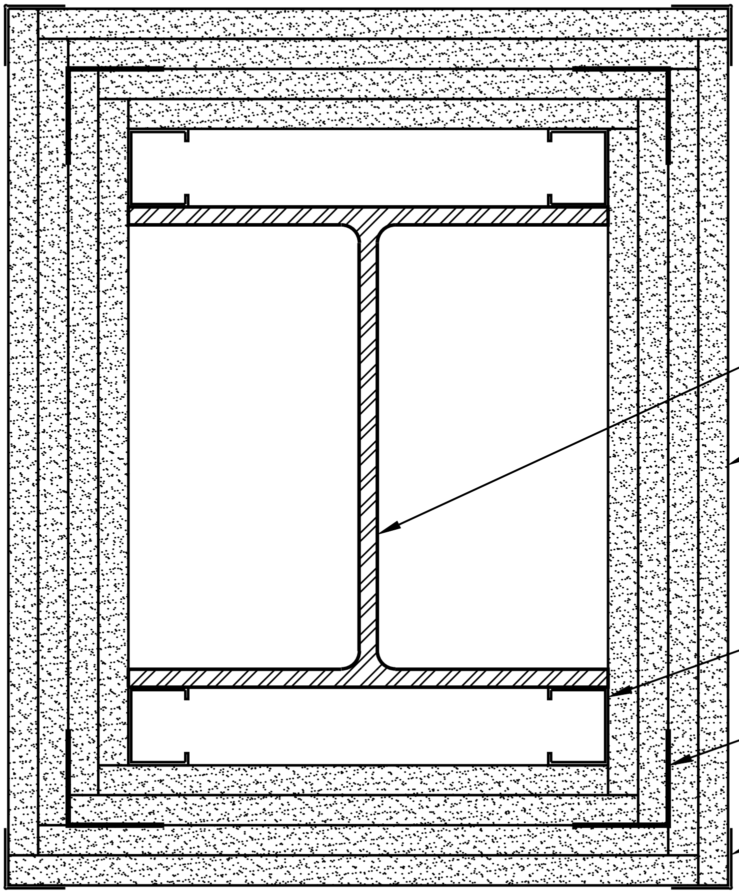
COLUMN - 2 HR
UL DESIGN: X528

DATE: 11/05/13	2 HOUR RATED COLUMN	National Gypsum
SCALE: 3"=1'-0"	DETAIL: CL 201	


MIN. W10X49 STEEL COLUMN
3 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1 5/8" STEEL STUD
CORNER BEAD

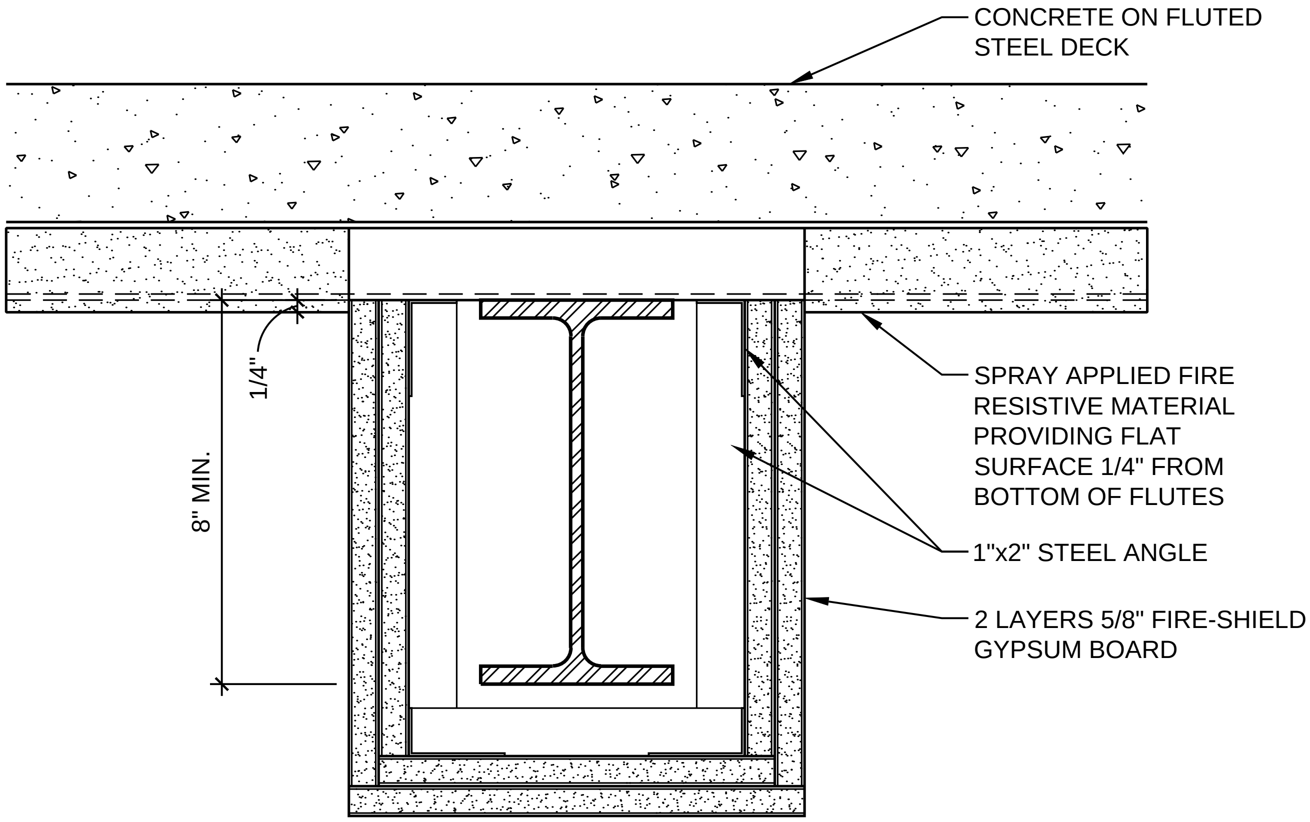
COLUMN - 3 HR
UL DESIGN: X510

DATE: 11/05/13	3 HOUR RATED COLUMN	National Gypsum
SCALE: 3"=1'-0"	DETAIL: CL 301	


MIN. W10X49 STEEL COLUMN
4 LAYERS 5/8" FIRE-SHIELD C GYPSUM BOARD
1 5/8" STEEL STUD
2" x 2" STEEL ANGLE
CORNER BEAD

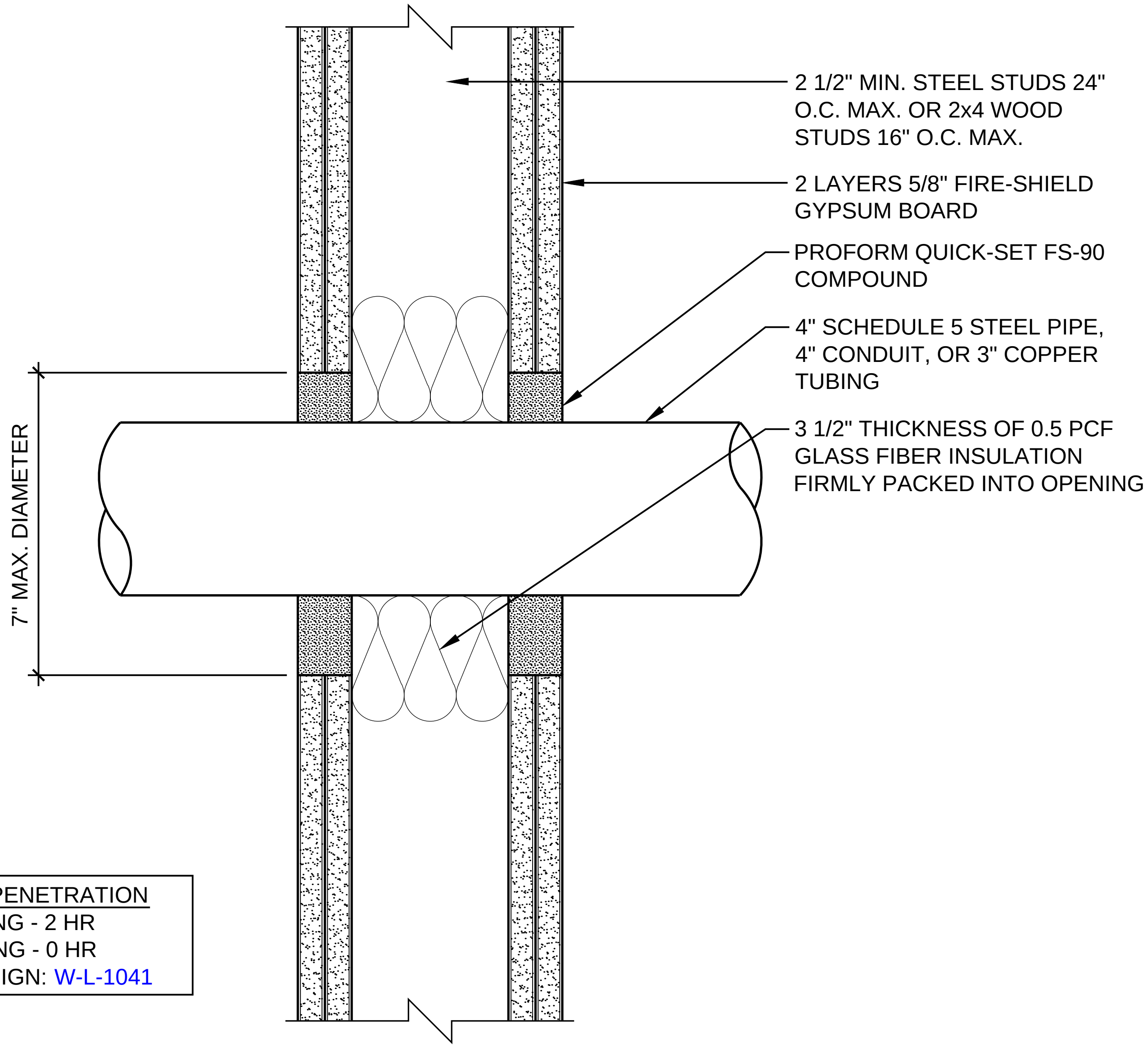
COLUMN - 4 HR
UL DESIGN: X501

DATE: 11/05/13	4 HOUR RATED COLUMN	National Gypsum
SCALE: 3"=1'-0"	DETAIL: CL 401	


CONCRETE ON FLUTED STEEL DECK
SPRAY APPLIED FIRE RESISTIVE MATERIAL PROVIDING FLAT SURFACE 1/4" FROM BOTTOM OF FLUTES
1"x2" STEEL ANGLE
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
1/4"
8" MIN.

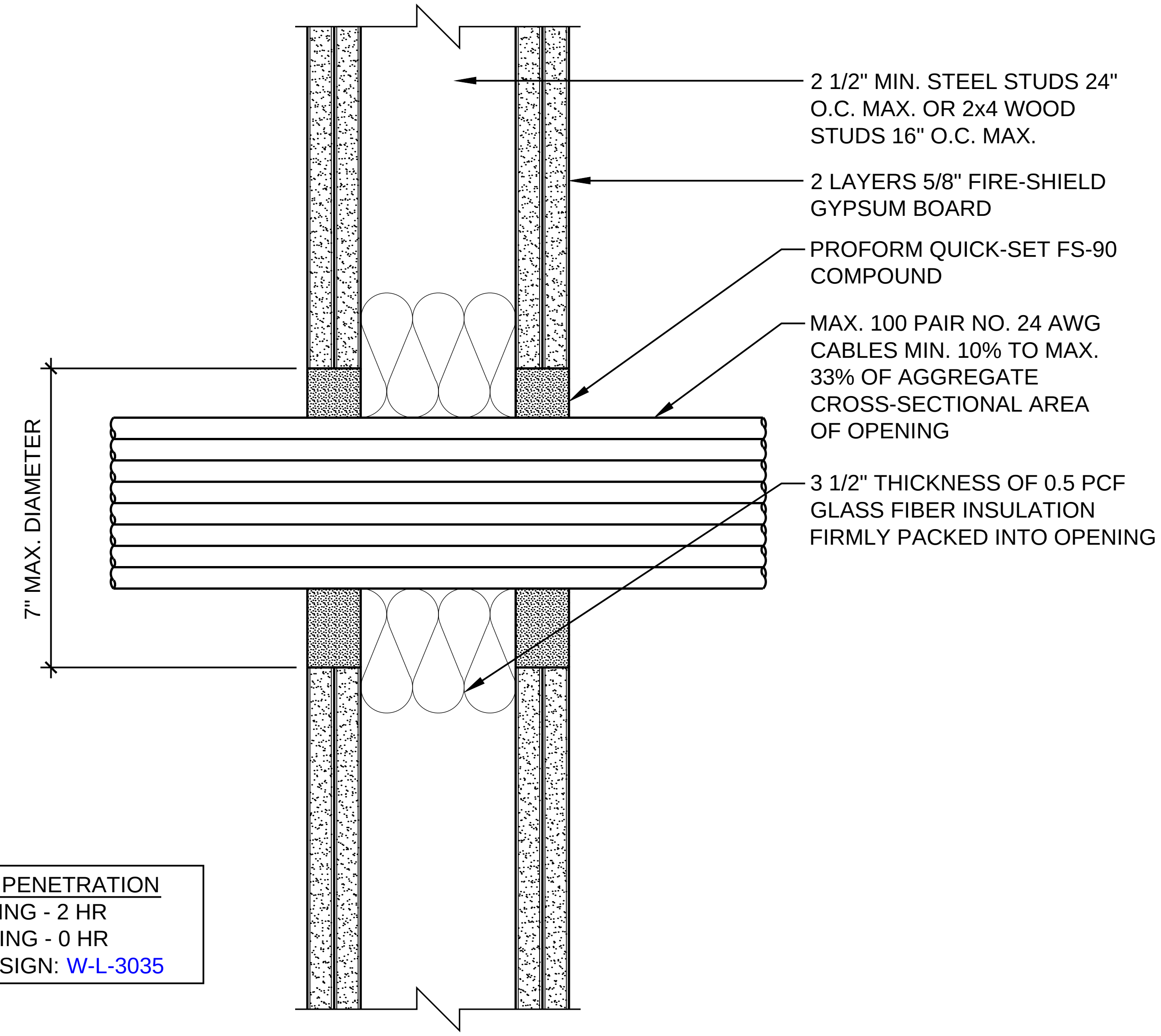
BEAM - 2 HR
UL DESIGN: N501

DATE: 11/05/13	2 HOUR STEEL BEAM	National Gypsum
SCALE: 3"=1'-0"	DETAIL: BM 101	


2 1/2" MIN. STEEL STUDS 24" O.C. MAX. OR 2x4 WOOD STUDS 16" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
PROFORM QUICK-SET FS-90 COMPOUND
4" SCHEDULE 5 STEEL PIPE, 4" CONDUIT, OR 3" COPPER TUBING
3 1/2" THICKNESS OF 0.5 PCF GLASS FIBER INSULATION FIRMLY PACKED INTO OPENING
7" MAX. DIAMETER

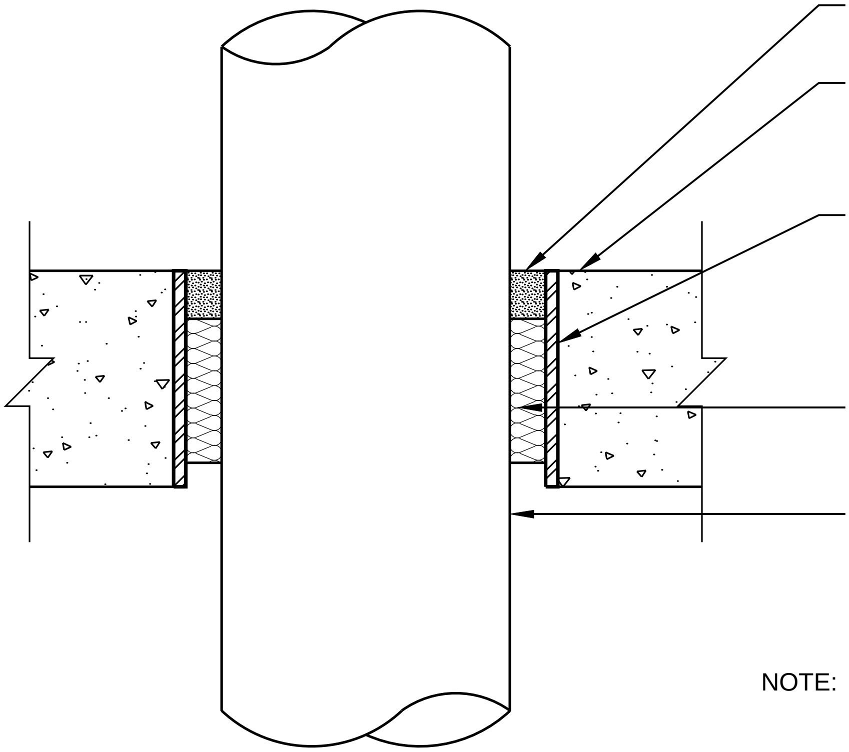
WALL PENETRATION
F RATING - 2 HR
T RATING - 0 HR
UL DESIGN: W-L-1041

DATE: 11/05/13	PIPE PENETRATION THROUGH WALL	National Gypsum
SCALE: 3"=1'-0"	DETAIL: PN 101	


2 1/2" MIN. STEEL STUDS 24" O.C. MAX. OR 2x4 WOOD STUDS 16" O.C. MAX.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
PROFORM QUICK-SET FS-90 COMPOUND
MAX. 100 PAIR NO. 24 AWG CABLES MIN. 10% TO MAX. 33% OF AGGREGATE CROSS-SECTIONAL AREA OF OPENING
3 1/2" THICKNESS OF 0.5 PCF GLASS FIBER INSULATION FIRMLY PACKED INTO OPENING
7" MAX. DIAMETER

WALL PENETRATION
F RATING - 2 HR
T RATING - 0 HR
UL DESIGN: W-L-3035

DATE: 11/05/13	CABLE PENETRATION THROUGH WALL	National Gypsum
SCALE: 3"=1'-0"	DETAIL: PN 202	



MIN. 1" THICKNESS PROFORM QUICK-SET FS-90 COMPOUND

MIN. 4 1/2" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR

NOM. 8" DIAMETER OR SMALLER STEEL EMT, CONDUIT OR PIPE GROUTED FLUSH WITH FLOOR OR WALL ASSEMBLY (OPTIONAL)

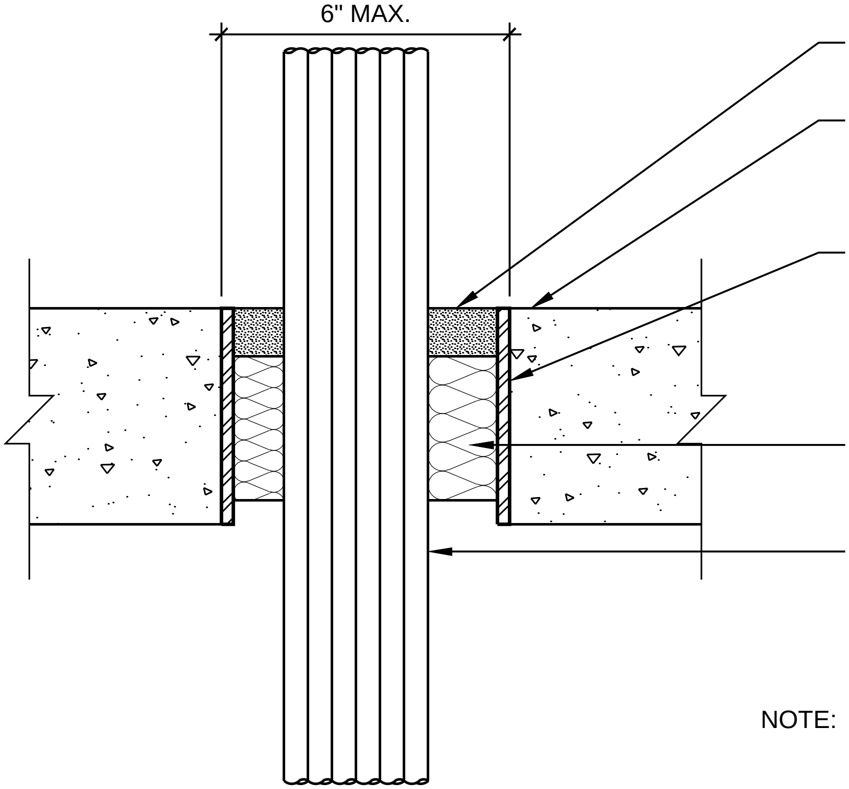
3" THICKNESS OF 6 PCF MINERAL WOOL INSULATION FIRMLY PACKED INTO OPENING

4" SCHEDULE 5 STEEL PIPE, 4" CONDUIT, OR 3" COPPER TUBING

NOTE: WALL ASSEMBLIES MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS

FLOOR PENETRATION
F RATING - 3 HR
T RATING - 0 HR
UL DESIGN: C-AJ-1163

DATE: 11/05/13	PIPE PENETRATION THROUGH FLOOR	National Gypsum
SCALE: 3"=1'-0"	DETAIL: PN 301	



MIN. 1" THICKNESS PROFORM QUICK-SET FS-90 COMPOUND

MIN. 4 1/2" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR OR MIN. 5" THICK CONCRETE WALL

NOM. 6" DIAMETER OR SMALLER SCHEDULE 40 STEEL EMT, CONDUIT OR PIPE GROUTED FLUSH WITH FLOOR OR WALL ASSEMBLY (OPTIONAL)

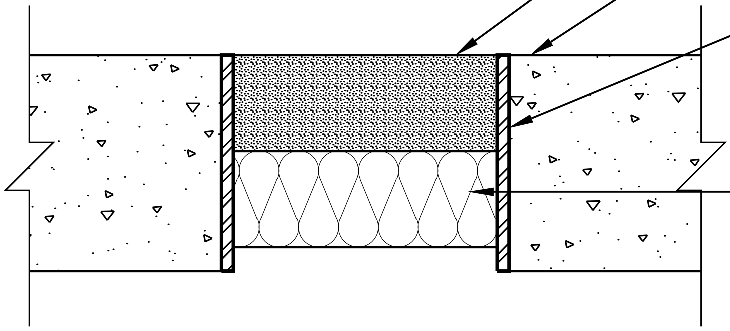
3" THICKNESS OF GLASS FIBER INSULATION FIRMLY PACKED INTO OPENING

MAX. 100 PAIR NO. 24 AWG CABLES MIN. 10% TO MAX. 40% OF AGGREGATE CROSS-SECTIONAL AREA OF OPENING

NOTE: WALL ASSEMBLIES MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS

FLOOR PENETRATION
F RATING - 3 HR
T RATING - 1/4 HR
UL DESIGN: C-AJ-3073

DATE: 11/05/13	CABLE PENETRATION THROUGH FLOOR	National Gypsum
SCALE: 3"=1'-0"	DETAIL: PN 302	



MIN. 2" THICKNESS PROFORM QUICK-SET FS-90 COMPOUND

MIN. 4 1/2" THICK LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE FLOOR

NOM. 6" DIAMETER OR SMALLER STEEL EMT, CONDUIT OR PIPE GROUTED FLUSH WITH FLOOR OR WALL ASSEMBLY (OPTIONAL)

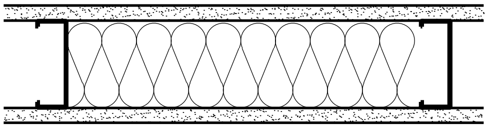
2" THICKNESS OF MIN. 6 PCF MINERAL WOOL INSULATION FIRMLY PACKED INTO OPENING

NOTE: WALL ASSEMBLIES MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS

VOID ASSEMBLY
F RATING - 3 HR
T RATING - 1/2 HR
UL DESIGN: C-AJ-0038

DATE: 11/05/13	VOID FILL ASSEMBLY	National Gypsum
SCALE: 3"=1'-0"	DETAIL: PN 303	

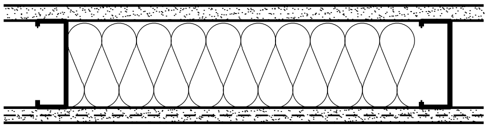
UL DESIGN: U465, V438



5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **16" O.C.**
3 1/2" GLASS FIBER INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD

STC 43
TEST: NGC 2502

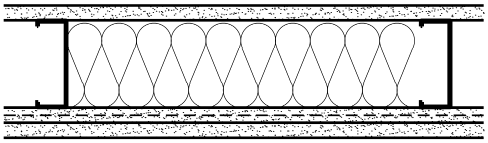
UL DESIGN: U465, V438



5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **16" O.C.**
3 1/2" GLASS FIBER INSULATION
5/8" SOUNDBREAK XP GYPSUM BOARD

STC 49
TEST: NGC2009058

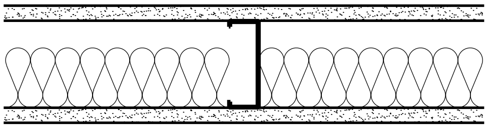
UL DESIGN: U465, V438



5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **16" O.C.**
3 1/2" GLASS FIBER INSULATION
5/8" SOUNDBREAK XP GYPSUM BOARD
5/8" FIRE-SHIELD GYPSUM BOARD

STC 52
TEST: RAL-TL07-148

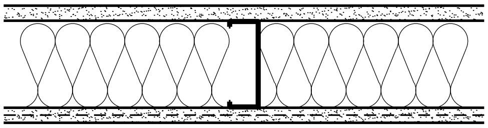
UL DESIGN: U465, V438



5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
2 1/2" GLASS FIBER INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD

STC 47
TEST: NGC 2386

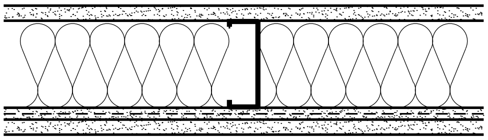
UL DESIGN: U465, V438



5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
3" MINERAL FIBER INSULATION
5/8" SOUNDBREAK XP GYPSUM BOARD

STC 54
TEST: RAL-TL07-389

UL DESIGN: U465, V438

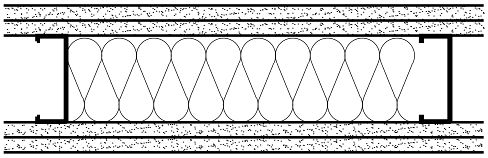


5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
3 1/2" GLASS FIBER INSULATION
1/2" SOUNDBREAK XP GYPSUM BOARD
5/8" FIRE-SHIELD GYPSUM BOARD

STC 57
TEST: RAL-TL06-334

DATE: 11/05/13	SOUND RATINGS FOR 1 HOUR PARTITIONS	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: SN 101	

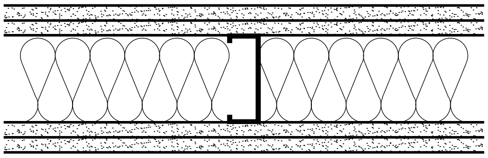
UL DESIGN: U411, V438



2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **16" O.C.**
3 1/2" GLASS FIBER INSULATION
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STC 50
TEST: NGC 2500

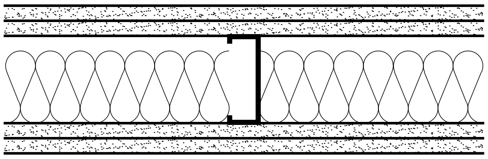
UL DESIGN: U411, V438



2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
3 1/2" GLASS FIBER INSULATION
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STC 53
TEST: NGC2007002

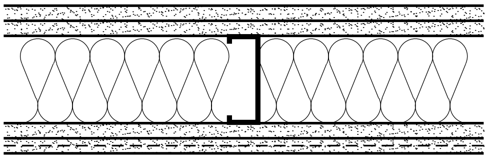
UL DESIGN: U411, V438



2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
3" MINERAL FIBER INSULATION
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STC 56
TEST: NGC 3022

UL DESIGN: U411, V438

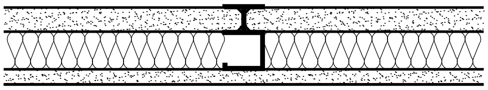


2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD
3 5/8" 25GA. STEEL STUDS **24" O.C.**
3 1/2" GLASS FIBER INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD
5/8" SOUNDBREAK XP GYPSUM BOARD

STC 60
TEST: RAL-TL07-168

DATE: 11/05/13	SOUND RATINGS FOR 2 HOUR PARTITIONS	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: SN 102	

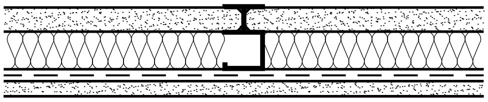
UL DESIGN: U499, W419



1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD

STC 42
TEST: NGC 2542

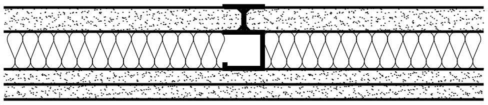
UL DESIGN: U499, W419



1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
1/2" RESILIENT CHANNEL 24" O.C.
5/8" FIRE-SHIELD GYPSUM BOARD

STC 48
TEST: NGC 2541

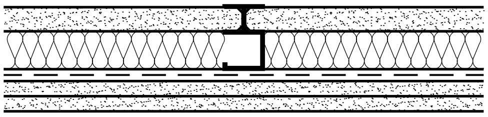
UL DESIGN: U497, W419



1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STC 48
TEST: NGC 2507

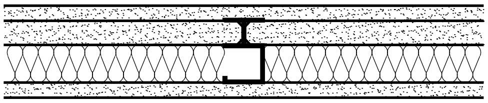
UL DESIGN: U497, W419



1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
1/2" RESILIENT CHANNEL 24" O.C.
2 LAYERS 5/8" FIRE-SHIELD GYPSUM BOARD

STC 51
TEST: NGC 2540

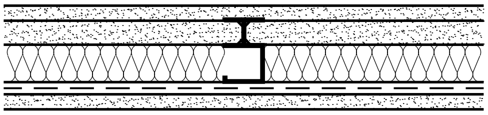
UL DESIGN: U498, W419



5/8" FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
5/8" FIRE-SHIELD GYPSUM BOARD

STC 48
TEST: NGC 2534

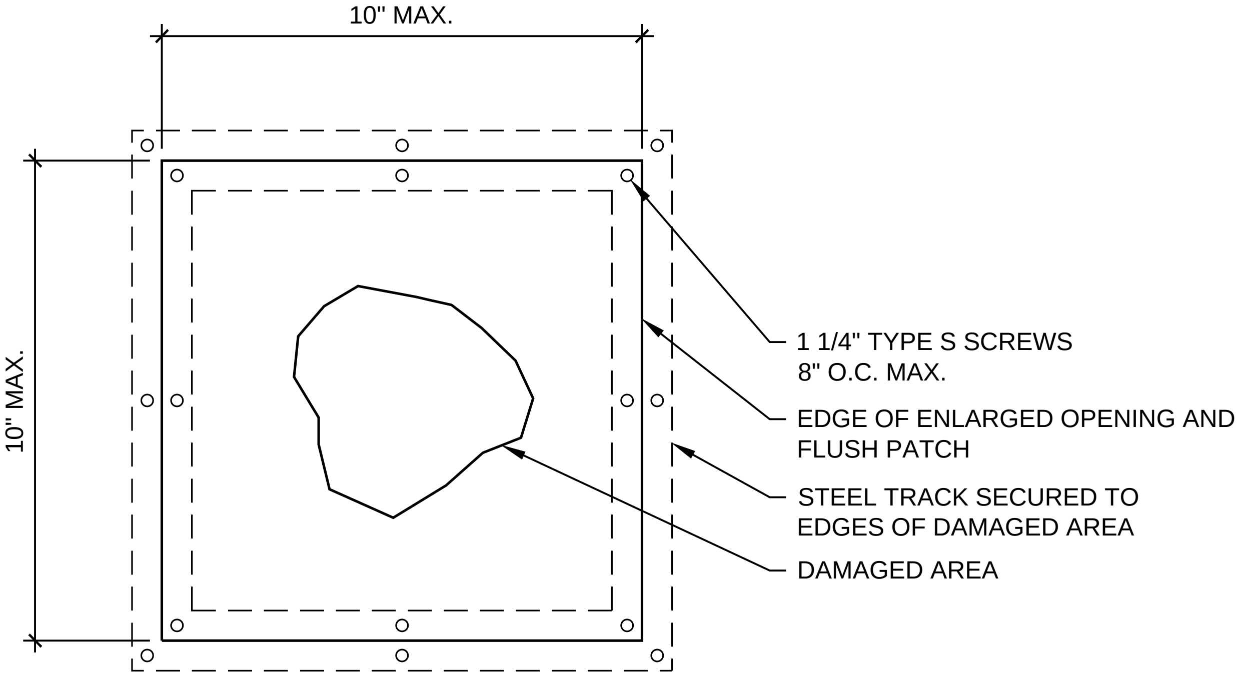
UL DESIGN: U498, W419



5/8" FIRE-SHIELD GYPSUM BOARD
1" FIRE-SHIELD SHAFTLINER
2 1/2" 25GA. CT, CH, OR I STUDS **24" O.C.**
1 1/2" GLASS FIBER INSULATION
1/2" RESILIENT CHANNEL 24" O.C.
5/8" FIRE-SHIELD GYPSUM BOARD

STC 52
TEST: NGC 2538

DATE: 11/05/13	SOUND RATINGS FOR SHAFTWALL PARTITIONS	National Gypsum
SCALE: 1 1/2"=1'-0"	DETAIL: SN 103	


10" MAX.
10" MAX.
1 1/4" TYPE S SCREWS
8" O.C. MAX.
EDGE OF ENLARGED OPENING AND
FLUSH PATCH
STEEL TRACK SECURED TO
EDGES OF DAMAGED AREA
DAMAGED AREA

FLUSH PATCH IN RATED PARTITION

FOR MEMBRANE PENETRATIONS LESS THAN 10" IN DIAMETER

NOTES:
FOR MULTIPLE LAYER SYSTEMS STAGGER VERTICAL AND HORIZONTAL PATCH JOINTS 12" MINIMUM AND FASTEN VERTICAL EDGES TO STUD FRAMING

FOR MINOR SURFACE ABRASIONS, PAPER TEARS, OR SMALL DENTS, REMOVE ALL LOOSE PAPER AND APPLY SETTING COMPOUND OVER THE DAMAGED AREA.

DATE: 11/05/13	REPAIR OF FIRE-RATED GYPSUM BOARD PARTITIONS	National Gypsum®
SCALE: 3"=1'-0"	DETAIL: RE 101	

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Construction Services

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With over 70 years of accumulated research, on-the-job experience and knowledge of building products and their application, National Gypsum is your resource for technical information. Beyond simply manufacturing and providing quality building products, National Gypsum has made a total commitment to technical assistance for our customers all along the line at every stage of a project's development.

You've got the questions ... we've got the answers.
From left, the technical service team: Mark Chapman, Sam Halverson and Jim Farrell.

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The Purple Book™

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